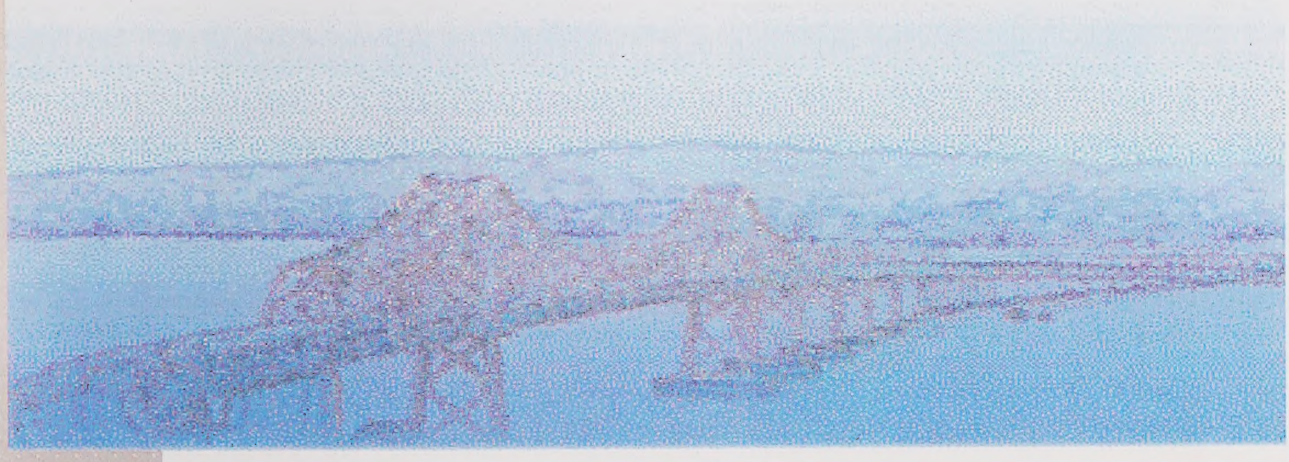
San Francisco – Oakland Bay Bridge
East Span Seismic Safety Project

Final

Environmental Impact Statement/ Statutory Exemption And Final Section 4(f) Evaluation

Volume I - FEIS



May 8, 2001

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

on Interstate 80 between
Yerba Buena Island and Oakland
in San Francisco and Alameda Counties

FINAL ENVIRONMENTAL IMPACT STATEMENT/ STATUTORY EXEMPTION AND FINAL SECTION 4(f) EVALUATION

Submitted pursuant to 42 USC 4332 (2)(c), 49 USC 303,
CSHC Section 180.2, and CEQA Section 21080

by the

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

and

THE STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

In Cooperation with the
U. S. COAST GUARD

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ABSTRACT: Caltrans proposes to ensure a lifeline vehicular connection between Yerba Buena Island in San Francisco and the SFOBB Toll Plaza in Oakland by seismically upgrading the existing East Span. Alternatives considered in the Draft EIS included no-build, existing structure retrofit, two replacement alternatives north of the existing bridge, and one replacement alternative to the south. Three bridge main span design variations (cable-stayed, self-anchored suspension, and skyway) were considered. In this Final EIS, Replacement Alternative N-6, the self-anchored suspension design variation with a bicycle/pedestrian path, is identified as the Preferred Alternative and the Least Environmentally Damaging Practicable Alternative (LEDPA). Long-term and temporary impacts include: potential displacement of Caltrans, Navy, and U.S. Coast Guard buildings; changes in visual setting; noise; hazardous wastes; water quality; loss of special aquatic sites and other Waters of the U.S.; disturbance of special status species habitat; and adverse effects to archaeological and historic resources. Mitigation measures include: revegetation; removal of contaminated soils; replacement of special aquatic sites; a treatment plan for archaeological resources; documentation of historic structures; and construction-period traffic control measures and Best Management Practices.

Copies of this Final EIS are available for review at the locations listed in the Preface.

PREFACE

The Final Environmental Impact Statement/Statutory Exemption/Final Section 4(f) Statement (FEIS) for the San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project (East Span Project) summarizes the impacts of alternatives to retrofit or replace the existing East Span. The Federal Highway Administration (FHWA) does not typically include a preface in environmental documents prepared pursuant to the National Environmental Policy Act (NEPA). A preface is provided in this FEIS to summarize events that affected the contents of the FEIS; it also lists the technical studies prepared in conjunction with the FEIS. This preface:

- Summarizes the actions and recommendations concerning design of replacement alternatives of the Metropolitan Transportation Commission (MTC), the regional transportation planning agency for the Bay Area;
- Presents a summary of the results of special studies prepared after publication of the DEIS to address issues raised by interested public agencies; these studies addressed the engineering feasibility used to develop the retrofit and replacement alternatives that are considered in this FEIS;
- Lists the technical studies and analyses that have been prepared for the East Span Project; and
- Identifies the locations where the FEIS and technical studies are available for review.

Project Development Activities Regarding Bridge Design

The MTC has played a major role in developing the East Span Project. MTC is a regional governmental agency that provides regional transportation planning and coordination of transportation activities for the nine-county Bay Area. MTC functions as both the regional transportation planning agency (RTPA), a state designation, and for federal purposes under 23 USC 134, as the region's metropolitan planning organization (MPO). As such, MTC is responsible for implementing the Regional Transportation Plan (RTP), which is a comprehensive blueprint for the development of mass transit, highway, airport, seaport, railroad, and bicycle and pedestrian facilities. Requests from local agencies for state and federal grants for transportation projects are screened by the MTC to determine their compatibility with the RTP. MTC is also the Bay Area Toll Authority (BATA), under Section 30950 of the California Streets and Highways Code.

MTC organized the San Francisco-Oakland Bay Bridge Design Task Force (Task Force) to consider replacement bridge alternatives following Governor Pete Wilson's February 1997 decision that replacement alternatives should be considered. All the members of the Task Force are MTC Commissioners. The Task Force mandate was to develop a consensus recommendation on a design option for a new eastern span of the SFOBB and recommend any additional features that might be included in the design of the bridge that would not be borne by funding allocated from the State of California. Bay Area bridge users, through a toll surcharge at the state-owned toll bridges, will pay for the additional features, such as a bicycle/pedestrian path.

The MTC Task Force formed an Engineering and Design Advisory Panel (EDAP) to advise the Task Force on issues of cost, engineering feasibility, design factors, and seismic safety. The EDAP is comprised of technical experts in structural and civil engineering and architecture. EDAP deliberations included meetings and workshops open to the public for presentation of design concepts from interested parties. Beginning with the first of four formal public hearings on March 27, 1997, the Task Force considered replacement bridge options (e.g., different types of replacement bridge structures) and the cost and feasibility of including amenities such as a tower for the main span and a bicycle/pedestrian path.

The Task Force made its summary recommendations to the California Department of Transportation (Caltrans) on July 30, 1997, concerning replacement bridge types, alignment, and a request for additional analysis needed to determine cost and feasibility of design components and features. Recommendations of the Task Force were transmitted to Caltrans and the State Legislature to assist in the determination of potential funding needs for the project.

In response to Task Force recommendations, Caltrans initiated the requested preliminary design studies. The 30-percent design studies were used to determine the seismic performance, cost, and aesthetics of the bridge types recommended for further study by the Task Force. The EDAP reviewed results of design studies in a series of public meetings and made specific recommendations to the Task Force (see Appendix E: Consultation and Coordination). On June 24, 1998, following extensive public comment, the Task Force forwarded an advisory recommendation to MTC that the replacement bridge be a concrete skyway structure with an asymmetrical self-anchored suspension main span supported by a single steel tower. A 4.7-meter (15.5-foot) wide bicycle/pedestrian path 0.3 meter (1 foot) higher than the traffic lanes located on the south side of the eastbound structure was also recommended and accepted by MTC.

Replacement Alternative N-6, self-anchored suspension design variation with a bicycle/pedestrian path, analyzed in this FEIS, is consistent with the bridge type recommendation defined through the Task Force proceedings and is designated as the Preferred Alternative in this FEIS. Caltrans and the FHWA have considered and performed preliminary engineering on a range of possible project alternatives in accordance with NEPA requirements and in consultation with permitting and regulatory agencies. Five alternatives (No-Build, Retrofit Existing Structure, two replacement bridges north of the existing bridge, and one replacement bridge south of the existing bridge) were considered in the Draft EIS for the East Span Project. Caltrans and the FHWA identified Replacement Alternative N-6 as the Preferred Alternative following circulation of the Draft EIS and consideration of public and agency comments on the document. Copies of the comments are contained in Volume II: Section 1 — DEIS Comments and Responses.

Project Activities Since Release of the DEIS

This FEIS has been prepared pursuant to the requirements of NEPA by FHWA and Caltrans, acting as joint lead agencies. The U.S. Coast Guard is a cooperating agency. The FEIS evaluates potential impacts of the Preferred Alternative

(Replacement Alternative N-6, self-anchored suspension design variation with a bicycle/pedestrian path) as well as four other alternatives that were evaluated in the Draft EIS. The alternatives have been assessed for their ability to provide a seismically upgraded bridge over a portion of San Francisco Bay between Yerba Buena Island (YBI) in San Francisco and Oakland. This project is exempt by statute from the requirements of the California Environmental Quality Act (CEQA) under California Streets and Highways Code (CSHC) Section 180.2 and CEQA Section 21080.

On September 24, 1998, the DEIS was circulated for a 60-day public review period, during which public hearings were held on the project. The hearings were held in Alameda, Contra Costa, San Francisco, and Solano counties in October 1998. Public and agency comments were accepted orally and in writing at public hearings and accepted directly from commenters by mail, facsimile, and e-mail. The public review period closed on November 23, 1998. Some comments, along with new issues raised since the DEIS, led to substantial activity to reexamine several aspects of the project.

The City and County of San Francisco and the Navy expressed strong opposition to any replacement alternative placed north of the existing bridge. The CCSF was concerned with the impacts of a northern alternative on future development of land on YBI that is expected to be transferred from the Navy to CCSF under the Defense Base Closure and Realignment Act. The Navy's opposition to a northern alternative was based on its view that there would be adverse impacts to historic resources and the CCSF's concerns about economic impacts on the future redevelopment potential of properties as envisioned in the Draft Naval Station Treasure Island Reuse Plan (1996 Draft Reuse Plan).

In late 1998 and early 1999, efforts were made to resolve the concerns of the CCSF and the Navy, including meetings and negotiations led by the National Economic Council, an office within the Executive Branch of the federal government. In response to these efforts, Caltrans prepared several additional studies. One study (Land Use Associated with the SFOBB East Span Seismic Safety Project and the Naval Station Treasure Island Draft Reuse Plan, dated January 2000) evaluated the potential impacts of the East Span Project on the CCSF's proposed development on the eastern side of YBI. The conclusion of the study was that CCSF would retain redevelopment potential on the eastern end of YBI with construction of any of the East Span build alternatives, although some adjustments would be required with the northern replacement alternatives. To date, the only public document addressing CCSF's proposals for base reuse is the 1996 Draft Reuse Plan, which was approved by the San Francisco County Board of Supervisors in 1996. As part of its baseline assumptions, the CCSF's Draft Reuse Plan assumed that the existing SFOBB will remain in place, since the plan was prepared before replacement alternatives for the SFOBB had been developed. The Draft Environmental Impact Report (required by the California Environmental Quality Act) and the Draft Environmental Impact Statement (required by the National Environmental Policy Act) for base reuse have not yet been published by the CCSF and the Navy; these pending documents will provide more up-to-date information about the alternatives being considered for base reuse.

Another Caltrans study (CCSF S-1 Modified Alignment and the Impacts to the EMBUD Sewer Outfall, dated November 1999) examined the potential impacts of a southern

alternative that the CCSF was proposing in place of the alternatives discussed in the East Span DEIS. Caltrans concluded that the CCSF Modified S-1 Alternative would result in cost increases in the millions of dollars, increased risk of environmental damage resulting from possible effluent release from the outfall, and complexity of long-term maintenance. Because of the disagreement between the CCSF and Caltrans, the National Economic Council asked the U.S. Army Corps of Engineers (ACOE) to complete an independent review of reports, data, and analyses conducted by both Caltrans and CCSF in regard to impacts to the outfall. On January 7, 2000, the ACOE concluded that constructing the CCSF Modified S-1 Alternative over the EBMUD outfall would delay the project schedule by a minimum of 8 to 15 months, increase construction risks, and increase project costs by tens of millions of dollars.

In February 2000, the CCSF raised two new issues, suggesting that the existing span could be retrofitted to meet lifeline standards and that the design for Replacement Alternative N-6 was unsound. In April 2000, Caltrans completed a report (Replacement vs. Retrofit) to summarize information on these two issues. At the request of the National Economic Council, the ACOE conducted an independent review of the information culminating in conclusions in September and October 2000. The ACOE concluded that replacing the existing bridge would be better than retrofitting it and that the replacement structure type was appropriate. ACOE also stated in its final report that "Based on safety considerations, it is the Corps team's opinion that, at this point in time, a replacement alternative is preferable to a retrofit alternative. A replacement alternative is the path that most quickly resolves the exposure of the public to the seismic vulnerabilities of the existing structure."

Naval Station Treasure Island is currently undergoing base closure and the Navy is working closely with CCSF, the Local Reuse Authority following base closure policies. At the same time the base closure procedure was progressing, Caltrans' project to seismically upgrade the East Span following the 1989 Loma Prieta earthquake was progressing. In order to provide adequate land for the East Span Project, on October 26, 2000, FHWA used its authority under 23 USC 107 (d)[1] to transfer to Caltrans the Navy land on YBI needed for the East Span Project. This action allowed Caltrans to file a deed for the land on October 25, 2000, providing Caltrans with adequate rights-of-way and control of access for construction of any alternative under consideration.

Concerns regarding impacts to historic properties were raised by several parties, including the Oakland Landmarks Preservation Advisory Board and the Navy. Meetings were held in December 1998 and February 1999 to discuss the impacts and possible measures to mitigate project effects on historic properties. The MOA was revised based on consideration of comments received. In late May 2000, an alternative-neutral MOA was executed by all required parties: SHPO, ACHP, USCG, and FHWA (see Appendix O for a copy of the executed MOA). The Navy, local

[1] 23 USC 107(d) states that "Whenever rights of way, including control of access, on the Interstate System are required overlands or interest in lands owned by the United States, the Secretary may make such arrangements with the agency having jurisdiction over such lands as may be necessary to give the State or other person constructing the projects on such lands adequate rights-of-way and control of access thereto from adjoining lands, and any such agency is directed to cooperate with the Secretary in this connection."

governments, and Native Americans were also invited to sign the MOA as concurring parties. Three Native Americans signed the MOA as concurring parties.

In December 1998, following receipt and consideration of all public and agency comments on the DEIS, Caltrans identified a Preferred Alternative (Replacement Alternative N-6). FHWA identified Replacement N-6 as its Preferred Alternative in October 2000, after receiving the results of ACOE's review of retrofit versus replacement. A meeting was held on October 10, 2000 in which FHWA and Caltrans made a presentation to ACOE and the U.S. Environmental Protection Agency (EPA) indicating that Replacement Alternative N-6 was also the Least Environmentally Damaging Practicable Alternative (LEDPA). The USCG also attended the October 10, 2000 meeting. ACOE and EPA asked at the meeting that Caltrans respond to several technical questions regarding environmental impacts and project design. Caltrans subsequently provided the agencies with responses to the questions that had been raised. On February 12, 2001, ACOE concurred with the identification of Replacement Alternative N-6 as LEDPA. EPA concurred on March 15, 2001.

The impacts information presented herein is based upon the following technical studies and analyses that have been prepared for the project.

Addendum Archaeological Survey Report – Maritime Archaeology
Addendum Finding of Adverse Effect
Air Quality Study Memorandum
Bicycle and Pedestrian Study
Biological Assessment
Biological Assessment (Retrofit Existing Bridge Alternative)
CCSF S-1 Modified Alignment and the Impacts to the EBMUD Sewer Outfall
Community Impact Assessment
Conceptual Mitigation Plan for Special Aquatic Sites (presented in Appendix N)
Consideration of Proposed Mitigation Measures for Project Effects on Historic Buildings and Structures
Dredged Material Management Plan (presented in Appendix M)
Finding of Adverse Effect: Buildings and Structures
Finding of Effect for Archaeological Resources
Hazardous Wastes Assessment
Historic Architecture Survey Report
Historic Property Survey Report
Land Use Issues Associated with the SFOBB East Span Seismic Safety Project and the Naval Station Treasure Island Draft Reuse Plan
Location Hydraulic Study
Natural Environment Study
Noise and Vibration Study
Phase I Archaeological Survey Report — Maritime Archaeology
Positive Archaeological Survey Report
Relocation Impact Report
Retrofit vs. Replacement
Sediment Sampling and Analysis Report
Supplemental Draft Section 4(f) Evaluation
Traffic Circulation, Access, and Parking Assessment
Treatment BMP Feasibility Study
Visual Impact Assessment

Document Distribution

Copies of this FEIS and the technical studies that support this FEIS are available at the following locations:[2]

Caltrans Public Information Office
111 Grand Avenue
Oakland, CA 94612-3006
(510) 286-4444

Contra Costa County Library
1750 Oakpark Boulevard
Pleasant Hill, CA 94526
(925) 646-6434

Metropolitan Transportation Commission/Association of Bay Area Governments Library
101 Eighth Street
Oakland, CA 94607
(510) 464-7700

Oakland Main Library
125 14th Street
Oakland, CA 94612
(510) 238-3134

San Francisco Main Library
100 Larkin Street
San Francisco, CA 94102
(415) 557-4400

John F. Kennedy Library
505 Santa Clara Street
Vallejo, CA 94590
(707) 553-5568

The FEIS can also be found on the internet at the following website address: www.dot.ca.gov/dist4.

Caltrans can be contacted by e-mail at sfobb.dist04@dot.ca.gov.

This FEIS is being distributed to all persons, organizations, and agencies noted on the distribution list or that have requested a copy. The FEIS will also be made available to interested persons and groups. No action can be taken on the project until a Record of Decision is issued, a minimum of 30 days following the notice of the FEIS availability in the Federal Register.

[2] Because the Positive Archaeological Survey Report, Archaeological Resources and Finding of Effect for Archaeological Resources Report contain confidential information about the location of archaeological resources, they are not available for public review.

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SUMMARY

The California Department of Transportation (Caltrans) proposes to retrofit or replace the San Francisco-Oakland Bay Bridge (SFOBB) East Span, which has carried vehicles between Yerba Buena Island (YBI) and Oakland since 1936. The East Span is a double-deck structure 3,696 meters (12,127 feet) in length carrying five traffic lanes in east-and westbound directions.

This FEIS has been prepared by Caltrans and the Federal Highway Administration (FHWA) pursuant to the National Environmental Policy Act (NEPA) to analyze potential environmental and socioeconomic impacts of several possible replacement bridge alternatives, as well as a retrofit of the existing structure and no-build alternatives. The project is exempt by statute from the provisions of the California Environmental Quality Act (CEQA). The U.S. Coast Guard (USCG) is a cooperating agency as a result of its legal jurisdiction to grant or deny a bridge permit. The U.S. Army Corps of Engineers (ACOE) declined to be a cooperating agency. The U.S. Navy was not a cooperating agency, however it participated in key processes throughout the project.

S.1 PROJECT VICINITY AND PROJECT LIMITS

Alternatives analyzed in this FEIS would seismically retrofit or replace the East Span and involve construction activities and physical changes on both ends of the span at YBI and the Oakland Touchdown and within San Francisco Bay. The western project limit is the eastern portal of the YBI tunnel located within the City and County of San Francisco (CCSF); however, project related traffic controls may extend to the western portal of the YBI tunnel and signage may extend to the West Span approach in San Francisco. The eastern project limit is located approximately 400 meters (1,312 feet) west of the toll plaza on a spit of land referred to as the Oakland Touchdown area in the City of Oakland, Alameda County. Project-related traffic controls and signage could extend east to the toll plaza (See Figure 2-3 in Appendix A). The project study area includes San Francisco Bay waters adjacent to the bridge in which construction activities would occur and Bay waters on the north side of YBI to allow for delivery of bulk materials by barge or vessel to staging areas.

S.2 PURPOSE OF AND NEED FOR THE PROJECT

The SFOBB is an important transportation component of the Bay Area providing regional access between the San Francisco Peninsula and the East Bay. On average 272,000 vehicles currently use the bridge each day. As a component of Interstate 80 (I-80), it is also a critical link in the interstate highway network.

The existing East Span is not expected to withstand a maximum credible earthquake (MCE) on the San Andreas fault (an earthquake of magnitude 8 on the Richter scale) or Hayward fault (an earthquake of magnitude 7 ¼ on the Richter scale); it does not meet lifeline criteria for providing emergency relief access following an MCE; and, it does not meet (all) current operations and safety design standards.

The project's Purpose and Need Statement was drafted following FHWA Technical Advisory T 6640.8 "Guidance Material for the Preparation of Environmental Documents," and more fully developed with public input received at MTC Bay Bridge Design Task Force and Engineering Design Advisory Panel (EDAP) meetings. The Purpose and Need Statement was further refined through a collaborative process among federal agencies as outlined in the NEPA/404 Integration Memorandum of Understanding (MOU) (see Section 1.1 - Project Purpose and Section 1.2 - Need for Project). Due to the scale of the project, some members of the regional community urged that congestion relief be included as part of the project purpose in addition to providing a vehicular lifeline connection. The scope of the project was not expanded to include congestion relief, however, because this would have resulted in lengthy public debate about how best to implement a congestion relief solution including a plan for implementation in the YBI Tunnel and on the West Span. This would have caused the seismic safety component of the project to be substantially delayed. Caltrans anticipates beginning construction of this project in fall 2001; however, this would not have been possible if the scope of the project had included congestion relief.

This project is one of several that Caltrans has completed or is currently undertaking to address the overall need for a bridge connection between the cities of San Francisco and Oakland that meets lifeline criteria. The other projects include replacing the west approach in San Francisco, retrofitting the West Span, West YBI Viaduct and YBI tunnel, and the interim retrofit on the East Span.

S.3 PROJECT DESCRIPTION AND ALTERNATIVES

Twelve alternatives, in addition to the No-Build Alternative, were considered during the scoping phase of this project. Five alternatives including the No-Build Alternative were carried forward for the detailed analysis in this EIS, as described below. The project alternatives are shown on Figure 2-3 in Appendix A.

S.3.1 No-Build Alternative

The No-Build Alternative, which would retain the existing SFOBB East Span, would not meet the project purpose and need criteria and was evaluated primarily as a basis for comparison with the build alternatives. The No-Build Alternative assumes the seismic improvements to the East Span that were completed under the Interim Retrofit Project, completed in the summer of 2000, which strengthened bents and columns on the viaduct section on YBI and strengthened piers, bents, and trusses at selected locations on the cantilever and skyway portions of the structure.

S.3.2 Replacement Alternative N-6 (Preferred)

Replacement Alternative N-6 would meet the project purpose and need criteria. This alternative involves constructing a new bridge (two side-by-side bridge decks, each deck consisting of five lanes) north of the existing alignment and dismantling the existing structure. This alignment has been designed to maximize views of the San Francisco skyline to the north of YBI for westbound motorists and views of the East Bay Hills for eastbound motorists, while minimizing construction in portions of the Bay where geologic conditions could increase the complexity and cost of constructing bridge

piers. The overall length of Replacement Alternative N-6 is approximately 3,514 meters (11,525 feet). Approximately 600 meters (1,968 feet) east of the YBI Tunnel, the alignment would transition from a double-deck viaduct structure to two parallel structures and would conform to existing traffic lanes at the Oakland Touchdown area approximately 1,300 meters (4,264 feet) to the west of the SFOBB Toll Plaza. Replacement Alternative N-6 would include a bicycle/pedestrian path on the south side of the eastbound structure. The path would be 4.7-meter (15.5-foot) wide and 0.3 meter (1 foot) higher than adjacent eastbound traffic lanes.

S.3.3 Replacement Alternative N-2

Replacement Alternative N-2 would meet the project purpose and need criteria. This alternative is similar to Replacement Alternative N-6, but the proposed bridge would be aligned north of the existing structure, and south of Replacement Alternative N-6. The alternative has been designed to minimize the length of the new bridge by closely following the alignment of the existing East Span. Approximately 600 meters (1968 feet) east of the YBI Tunnel the alignment would transition from a double-deck viaduct structure to two parallel structures. The 3,479-meter (11,411-foot) long span would reach the Oakland shore along the northern edge of the existing Oakland Touchdown area and conform to the existing traffic lanes approximately 1,300 meters (4,264 feet) to the west of the SFOBB Toll Plaza. Replacement Alternative N-2 would include a bicycle/pedestrian path on the south side of the eastbound structure. The path would be 4.7-meter (15.5-foot) wide and 0.3 meter (1 foot) higher than adjacent eastbound traffic lanes.

S.3.4 Replacement Alternative S-4

Replacement Alternative S-4 would meet the project purpose and need criteria. This alternative involves constructing a new bridge (two side-by-side bridge decks, each deck consisting of five lanes) south of the existing alignment and dismantling the existing structure. Replacement Alternative S-4 has been developed to avoid conflicts with the in-Bay portion of the existing East Bay Municipal Utility District (EBMUD) sewer outfall, which parallels the existing East Span to the south (see Figure S-1). This alternative would exit the YBI Tunnel on a double-deck viaduct structure and transition to two parallel structures approximately 600 meters (1,968 feet) east of the YBI tunnel. The 3,550-meter (11,644-foot) long span would reach the Oakland shore south of the existing East Span and conform to the existing traffic lanes approximately 1,500 meters (4,920 feet) to the west of the SFOBB Toll Plaza. Replacement Alternative S-4 would include a bicycle/pedestrian path on the south side of the eastbound structure. The path would be 4.7-meter (15.5-foot) wide and 0.3 meter (1 foot) higher than adjacent eastbound traffic lanes.

S.3.5 Retrofit Existing Structure Alternative

The Retrofit Existing Structure Alternative would not fully meet purpose and need criteria. This alternative would seismically retrofit and rehabilitate the existing East Span to withstand an MCE without collapse, but the bridge would most likely experience substantial damage requiring extensive repair or reconstruction that would involve an extended period of closure. This alternative does not meet lifeline criteria

because the closures would impede the bridge's ability to provide emergency relief access. The alignment of the bridge would remain unchanged. Improvements would be made to the existing structure and the East YBI Viaduct that would strengthen the substructure and modify the superstructure to permit large displacements at specified joints. In addition, two new piers would be added to the cantilever main span to provide additional support. In addition, the Retrofit Existing Structure Alternative would not permit changes to the existing bridge (roadway design); therefore, current design standards could not be attained.

S.3.6 Preferred Alternative and Least Environmentally Damaging Practicable Alternative

In December 1998, after a thorough evaluation of project alternatives and consideration of comments from the public and agencies on the DEIS, Caltrans identified Replacement Alternative N-6, self-anchored suspension design variation including a bicycle/pedestrian path, as its Preferred Alternative. In October 2000, FHWA also identified Replacement Alternative N-6 as the Preferred Alternative. Replacement Alternative N-6 has been identified as the Preferred Alternative on the basis of greater ease of construction of the main tower based on geologic conditions, aesthetic benefits such as enhanced drivers' views, and consistency with regionally preferred alignment and design features such as expressed by the Metropolitan Transportation Commission.

On February 12, 2001, ACOE identified Replacement Alternative N-6 as the Least Environmentally Damaging Practicable Alternative (LEDPA) and on March 13, 2001, the Environmental Protection Agency (EPA) also identified Replacement Alternative N-6 as the LEDPA. The basis for the decision was that Replacement Alternative N-6 avoids conflicts with the USCG's YBI facility, does not take land on the Oakland Touchdown designated by the Oakland Base Reuse Authority (OBRA) for a proposed park, provides easier access to bedrock to construct the main span tower, and avoids conflicts with the EBMUD's facilities and operations. (See Section 2.2.6 - Preferred Alternative and Least Environmentally Damaging Practicable Alternative for further detail). The LEDPA determination is required by Section 404 of the Clean Water Act. Letters of concurrence on the LEDPA from ACOE and the EPA can be found in Appendix F.

S.3.7 Design Variations

Design variations identified for the replacement alternatives are limited to the type of bridge to be constructed over the navigational channel. The span type variations include a cable-stayed design, a self-anchored suspension design and a skyway design. In June 1998, after considering seismic performance, aesthetics, costs, and ability to construct the bridge as soon as possible, and the possible location of a bicycle/pedestrian path, the EDAP recommended the self-anchored suspension design.

S.3.8 Costs

Construction costs (2002 dollars), associated with each alternative are shown in Table S-1. The cost for the replacement alternatives shown in the table assume the preferred design variation (self-anchored suspension).

In April 2001, Caltrans published updated cost information for the Preferred Alternative (Replacement Alternative N-6, suspension bridge design option). It reflects cost increases due to such factors as increasing construction costs in a robust and competitive local economy; significant increases in the costs of steel; schedule delays which magnified the inflationary effect; and additional design amenities such as the belvederes and a wider bike path than is standard. Caltrans estimates that the current cost of Replacement Alternative N-6, suspension bridge design option, would be $2.6 billion.

Caltrans did not prepare updated cost estimates for the other project alternatives in April 2001. However, the most significant factors contributing to increased costs would apply to all of the build alternatives.

The enabling legislation for the project, Senate Bill 60, signed by then-Governor Pete Wilson in 1997, anticipated the possible need for additional funding beyond original estimates and required Caltrans to return to the Legislature if necessary. In accordance with Senate Bill 60, Caltrans has submitted its cost estimates to the Legislature and anticipates that it will address the need for additional funding within the next few months.

Table S-1 Cost Estimate Summary for Build Alternatives

Alternative	Cost to Construct (in $ billions)
Replacement Alternative N-6	1.50 – 1.65
Replacement Alternative N-2	1.55-1.60
Replacement Alternative S-4	1.55 – 1.60
Retrofit Existing Structure	0.90

Source: Caltrans, May 1998

S.3.9 Accommodation of Multi-Modal Strategies

While none of the project alternatives presented above would include facilities for high occupancy vehicle (HOV) lanes or rail transit, a retrofitted East Span or a replacement span could accommodate an HOV lane or light rail transit (LRT) by converting one travel lane and one shoulder in each direction, reducing the capacity of the East Span to four travel lanes, and making some structural modifications. Since multi-modal strategies would reduce the number of mixed-flow travel lanes, the selected strategy would have to capture a ridership that matches the loss in mixed-flow vehicular capacity on the SFOBB and its approaches. Otherwise, vehicular operations on the SFOBB and approaches would be comparatively worse. The accommodation of rail and five lanes of traffic would require significant modifications.

As currently proposed, the retrofit or replacement East Span could accommodate the live loads associated with LRT type trains. "Heavier" vehicles, such as commuter or high-speed rail, could also be accommodated but would require that substantial modifications be made to the current designs.

An HOV lane or rail on the East Span would therefore be structurally and operationally feasible; however, it was determined that implementation of either multi-modal strategy would involve substantial institutional and funding challenges.

An HOV lane or rail on the SFOBB has not been identified as necessary in any regional planning process or document. Neither the HOV nor a rail system is currently identified as a regional transportation priority. Before either can be included in the Regional Transportation Plan (RTP) as a priority, new institutional arrangements would be required, such as the identification of a governing body to operate the rail system. The body would not be created until there is a regional consensus on the strategy. This consensus does not currently exist.

The construction and operation of the facilities necessary to implement an HOV or rail system would require additional funding and sources of funding beyond those committed to the East Span Project. A rail system, in particular, would involve areas well beyond the SFOBB itself, because rail would be part of a much larger system extending throughout the region. No funding has been programmed or identified for either HOV lanes or rail on the bridge.

The implementation of any multi-modal strategy on the SFOBB would be subject to independent evaluation and funding as a separate project in the future. The East Span Project does not preclude the implementation of an HOV lane or a rail system on the East Span in the future.

S.3.10 Alternatives Considered but Withdrawn

In addition to the alternatives considered above, Caltrans considered other project alternatives that were ultimately withdrawn from further consideration. These alternatives included the following: four northern alignments and four southern alignments for a replacement bridge with two side-by-side decks and a double-deck structure for either a northern or a southern alignment (see Figure 2-19 in Appendix A for side-by-side replacement alternatives).

These alternatives were rejected for a variety of reasons, as described in Section 2.7-Alternatives Considered and Withdrawn. Important considerations that contributed to rejection or withdrawal of alternatives included adverse geologic conditions (deep young Bay Mud and distance to bedrock for founding the main tower), inability to meet American Association of State Highway and Transportation Officials (AASHTO) design standards, less than optimal roadway geometry, constructablilty issues for temporary detours, conflicts with the EBMUD sewer outfall, and limitations on panoramic views.

S.3.11 Design Variations Considered But Withdrawn

Replacement refinement studies evaluated variations for the bridge profile, which refers to the rise in roadway elevation from the Oakland Touchdown area to the YBI East Viaduct connection. Although the MTC Bay Bridge Design Task Force Engineering and Design Advisory Panel (EDAP) stated a general preference for the elevated grade profile variation, a constant grade profile has been used in this analysis. Substantial cost savings were identified when the profile at the main span tower was lowered to a position similar to the constant grade variation yet was still acceptable to the overall bridge architecture. Additionally, construction of the bicycle/pedestrian path at the same grade as the bridge rather than at an elevated grade would produce slightly slower downhill speeds for bicyclists and result in improved safety for path users.

Single and dual-tower options were considered for the main span towers for the cable-stayed and self-anchored suspension design variations. Following an evaluation of seismic safety, potential environmental impacts, construction requirements, and aesthetic considerations, the single-tower design option was recommended by the EDAP and a dual-tower option was withdrawn from further consideration.

Through several meetings, Caltrans considered the interests and opinions of the Bicycle/Pedestrian Advisory Committee (BPAC). The committee considered design variations for a bicycle/pedestrian path on the replacement alternatives including a single path on one structure and dual paths, one on each structure. Caltrans also analyzed replacement alternatives without a path.

Based on recommendations of the committee and the approval by MTC to use toll revenues to fund a path, a single 4.7-meter (15.5-foot) wide path elevated 0.3 meter (1 foot) above the adjacent eastbound travel lanes has been added to the design of the eastbound structure for the replacement alternatives. BPAC's initial recommendation of a dual path design was not selected for the following reasons:

- Environmentally sensitive areas on the north side of the westbound structures at the Oakland Touchdown pose access constraints that do not exist with the single-path design;
- For security purposes (on days when the number of path users is moderate) it would be better to have all users on one path than spreading them over two paths;
- The cost of two paths would be greater; and
- The path on the north side of the westbound span heading uphill from Oakland to YBI could interfere with motorists' views.

S.4 ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS AND PROPOSED MITIGATION MEASURES

The No-Build Alternative would not implement any improvements and would therefore have no socio-economic or environmental impacts. However, such impacts could occur in the event of an MCE because the existing bridge would continue to be vulnerable to damage or collapse.

The Retrofit Existing Structure Alternative and all of the replacement alternatives, including the Preferred Alternative, would have short-term construction related and long-term (permanent) impacts on the physical and socioeconomic environment of the project study area.

Summary of Impacts

Table S-3 at the end of this chapter provides a summary of the environmental impacts of the project alternatives and proposed mitigation measures.

S.5 CONSULTATION AND COORDINATION

FHWA and Caltrans served as the joint lead agencies in preparation of this Environmental Impact Statement (NEPA)/Statutory Exemption (CEQA). The U.S. Coast Guard is a cooperating agency.

This environmental document was prepared in consultation and coordination with various federal, state, and local agencies and organizations. Notable consultation and coordination activities are summarized below.

S.5.1 Project Organization and Committees

Several groups were organized to advise Caltrans and FHWA decision-makers for the East Span Project. Table S-2 lists the groups and their roles.

Table S-2 Project Advisory Groups

Group	Role
Project Development Team (PDT) (Comprised of 31 Federal, State, and local agencies, elected officials, special service districts and professional organizations.)	Served as the technical advisory committee to Caltrans. Met periodically to address project issues requiring technical direction or resolution.
Metropolitan Transportation Commission Bay Bridge Design Task Force (Comprised of seven Metropolitan Transportation Commission Commissioners.)	Coordinated local deliberations on the location, design and potential funding strategies for a replacement structure.
MTC Bay Bridge Design Task Force Engineering and Design Advisory Panel (EDAP) (Comprised of technical experts in structural and civil engineering, seismicity and geology, and (bridge) architecture.)	Provided technical expertise, analysis and recommendations to the Task Force.
Bicycle/Pedestrian Advisory Committee (BPAC)	Represented the interests of various groups advocating installation of a

(Comprised of key members from ad-hoc bicycle, alternative transit, elderly/disabled community, and public access groups.)	bicycle/pedestrian path and proposed design features of the path on replacement alternatives.
Oakland Gateway Planning Group (Comprised of the East Bay Regional Park District, San Francisco Bay Conservation and Development Commission, Port of Oakland, City of Oakland, Oakland Landmarks Preservation Advisory Board, Oakland Army Base Reuse Authority, National Park Service and the Association of Bay Area Governments/Bay Trail, and Caltrans.)	Coordinated efforts to begin planning a shoreline park in the Oakland Touchdown area.

S.5.2 Key Interagency Coordination

NEPA/404 Integration Memorandum of Understanding (MOU) Process

Since September 1997, consultation has been ongoing with federal agencies under the western states Memorandum of Understanding (MOU) for integrating the requirements of NEPA and Section 404 of the Federal Clean Water Act. Under the MOU process, the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), the ACOE, the EPA and the Federal Transit Administration (FTA) have been asked to concur on the project purpose and need statement, criteria for alternative selection, and range of alternatives to be considered. Several meetings have been conducted to date under the MOU process. At the meetings, participants from the agencies listed above considered the seismic safety-based project purpose and need statement and the range of alternatives proposed for evaluation. Following the meetings, written concurrence was received from each signatory agency (letters are presented in Appendix F).

Consistent with the NEPA/404 Integration MOU, Caltrans and FHWA have identified Replacement Alternative N-6 as the Preferred Alternative in December 1998 and October 2000, respectively. The ACOE and the EPA identified Replacement Alternative N-6 as the LEDPA in February and March 2001, respectively, pursuant to Section 404(b)(1) of the federal Clean Water Act. EPA, ACOE and USFWS have also provided their preliminary agreement on conceptual mitigation for impacts to special aquatic sites (see letters in Appendix F).

Other federal, state, and regional agencies with regulatory and permitting obligations for the East Span Project were invited to participate in the NEPA/404 MOU meetings. These included:

- U.S. Coast Guard (Cooperating Agency);
- San Francisco Regional Water Quality Control Board;
- San Francisco Bay Conservation and Development Commission;

- California Department of Fish and Game; and
- Metropolitan Transportation Commission.

Coordination Regarding Historic Properties Pursuant to Section 106 of the National Historic Preservation Act

Meetings regarding historic resources involving Caltrans, the FHWA, the State Historic Preservation Officer (SHPO), the Navy, the USCG, the cities of Oakland and San Francisco, and the Advisory Council on Historic Preservation (ACHP) were held in compliance with Section 106 of the National Historic Preservation Act and its implementing regulations.

In April 1997, several organizations were invited to submit comments on the East Span Project with respect to historic properties. These organizations included:

- American Society of Civil Engineers, History and Heritage Committee;
- Berkeley Architectural Heritage Association;
- California Preservation Foundation;
- Foundation for San Francisco's Architectural Heritage;
- National Trust for Historic Preservation, Western Regional Office;
- Oakland Heritage Alliance;
- Oakland Landmarks Preservation Advisory Board; and
- San Francisco Landmarks Preservation Advisory Board.

In July 1997, Caltrans gave a brief presentation on the East Span Project to representatives of the Oakland Landmarks Preservation Advisory Board, Oakland Heritage Alliance, California Preservation Foundation, and San Francisco Landmarks Preservation Advisory Board. The Oakland Landmarks Preservation Advisory Board (LPAB) responded by letter on January 14, 1998, advocating that consideration be given to a retrofit of the existing bridge rather than a replacement and suggesting several mitigation measures if a replacement alternative were selected (See Appendix G for a copy of the letter).

Since then, Caltrans and the Oakland Landmarks Preservation Advisory Board (LPAB) have continued to coordinate regarding potential mitigation measures and other historic preservation issues associated with the East Span Project.

On December 10, 1998, Caltrans held a meeting with representatives from the City of Oakland and its Landmarks Preservation Advisory Board, the Oakland Heritage Alliance, and the Port of Oakland to discuss possible measures to mitigate project effects on historic properties.

On February 1, 1999, representatives from the Advisory Council on Historic Preservation ACHP, Caltrans, FHWA, the Navy, the CCSF, the USCG, and the SHPO toured the project area and the historic properties.

The following day, meetings were held to discuss project effects on historic properties and mitigation. Representatives from the CCSF, California Preservation Foundation, National Park Service (NPS), Navy, USCG, FHWA, SHPO, and ACHP attended the first

meeting and discussed the differing effects of the replacement alternatives on the Navy's historic properties on Yerba Buena Island and measures proposed to mitigate project effects on them. Representatives from the City of Oakland's Landmarks Board and Public Works Department, Port of Oakland, FHWA, SHPO, and ACHP attended the second meeting and discussed measures to mitigate for the loss of the East Span under the replacement alternatives.

An Addendum Finding of Adverse Effect Report and Consideration of Proposed Mitigation Measures were sent to the SHPO, ACHP, Navy, USCG, local governments, and other interested parties in October 1999. A draft Memorandum of Agreement (MOA), included in the Consideration of Proposed Mitigation Measures Report, was also distributed for review and comment. After consideration of comments, the MOA was finalized and executed in May 2000. On May 26, 2000, an alternative-neutral MOA was signed by all required parties: SHPO, ACHP, USCG, and FHWA. The Navy, local governments, and Native Americans were also invited to sign the MOA as concurring parties and the MOA was circulated to these concurring parties in June 2000. Three Native Americans signed the MOA as concurring parties. A copy of the MOA is included in Appendix O.

Coordination has taken place with Native Americans concerning archaeological site SFr04/H. In November 1997, Caltrans solicited comments from 14 Native Americans regarding the upcoming excavation. The names of the Native Americans were provided by the California Native American Heritage Commission. Two Native Americans responded. The Archaeological Survey Report for SFr04/H, based on the excavation was sent to the Native American Heritage Commission and the Native American monitor who was present during site excavations. Caltrans will provide the treatment plan currently being prepared for the site to all Native Americans on the NAHC list and all signatories to the MOA with the goal of soliciting early input on its development.

For additional information, please see Sections 3.10 and 4.10 - Historic and Cultural Resources, Appendix E - Consultation and Coordination for chronology of Section 106 consultation, and Appendix O - Memorandum of Agreement.

Coordination Pursuant to Section 4(f) of the Department of Transportation Act

Section 4(f) of the Department of Transportation Act of 1966, codified in Federal law at 49 U.S.C § 303, declares that "[i]t is the policy of the United States Government that special effort be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

Coordination pursuant to 4(f) took place concerning historic resources and the Gateway Park as summarized below.

Historic Resources

Pursuant to Section 4(f), coordination took place concerning historic resources such as the existing East Span and the historic structures on YBI. Details of this coordination can be found in the section above titled, Coordination Regarding Historic Properties Pursuant to Section 106 of the National Historic Preservation Act.

Gateway Park

The proposed Gateway Park is located at the Oakland Touchdown (see Figure 6-9 in Appendix A) on land that is part of the former Oakland Army Base (OARB). The OBRA's Reuse Plan designates 5.9 hectares (14.7 acres) at the westernmost portion of the Army Base as the site of a proposed public access shoreline park.

Caltrans initiated coordination meetings with the East Bay Regional Park District (EBRPD) and the Port of Oakland to discuss the East Span Project, land use issues, and Gateway Park development possibilities. The City of Oakland, the Army, the NPS, San Francisco Bay Conservation and Development Commission (BCDC), and Association of Bay Area Governments (ABAG) have also participated. Meetings to discuss the proposed park were held on October 7, 1997; November 18,1997; February 18, 1998; July 22, 1998; December 2, 1998; February 10, 1999 and August 11, 1999.

In response to the Department of the Interior's letter commenting on the DEIS, Caltrans and FHWA held a meeting with interested agencies on March 11, 1999 to discuss the status of the Gateway Park in relation to Section 4(f). In addition to Caltrans and FHWA, participants included staff from the City of Oakland, EBRPD, Port of Oakland and the National Park Service.

Participation by the National Park Service

The NPS participated in activities associated with the proposed Gateway Park in coordination with the East Span Project. The NPS attended meetings on October 7, 1997; November 4, 1997, February 18, 1997; May 20, 1997; June 2, 1998; July 22, 1998; and March 11, 1998. The NPS's key concern was the impact that Replacement Alternative S-4 could have on the Gateway Park.

City of Oakland

Numerous meetings were held with the Mayor's Office and staff from Planning, Economic Development, Landmarks Preservation Advisory Board, and Public Works divisions. City representatives have made presentations and comments at other public meetings, such as the MTC Bay Bridge Design Task Force and EDAP. The City's key concerns are the aesthetic design of the East Span and the Oakland Touchdown area, mitigation for impacts to the historic qualities of the existing East Span and the potential for community involvement and employment during the construction phase.

City and County of San Francisco

Numerous meetings were held with the Mayor's Office (Treasure Island Project) and staff from the Planning, Traffic and Parking, and Public Works departments. The key concerns of the CCSF are construction period impacts on Yerba Buena Island, land use conflicts that include potential loss of revenue, access impacts at Yerba Buena Island and Treasure Island, and detours and ramps on Yerba Buena Island.

United States Navy

Meetings were held with locally assigned Navy personnel from San Bruno and San Diego and personnel in Washington, D.C. to address the agency's key concerns including impacts to historic resources on YBI, impacts on the Navy's process to dispose of its property on YBI, and construction-period impacts.

United States Coast Guard

Meetings were held with the USCG regarding potential project impacts on its facility on Yerba Buena Island. The Coast Guard's key concerns are 24-hour, 7 days a week access to its facility during and after construction, slope stability, land use conflicts (including the replacement of four USCG buildings), and impacts to crew quality of life from construction-period activities such as noise, dust, debris, and safety.

S.5.3 Community Involvement

In addition to the scoping process, public open houses, and public hearings, a variety of public participation activities have been conducted over the course of the engineering and environmental studies. These public involvement activities are listed below followed by a brief description (please see Appendix E for additional information).

Scoping Meetings

MTC Bay Bridge Design Task Force scoping meetings gave agencies and the general public the opportunity to provide input on alternatives and issues to be evaluated in the EIS. Meetings were held in Contra Costa, Alameda, Solano, and San Francisco counties on April 16th, 22nd, 23rd, and May 8th, 1997, respectively.

Open Houses

Four additional public information open houses were provided to enable interested Bay Area residents to view the preliminary design concepts and obtain more information about the project. The open houses were held in Alameda, Contra Costa, San Francisco, and Solano counties on December 8th, 9th, and 11th, 1997 and March 25, 1998, respectively. Approximately 300 people attended.

Environmental Organizations Meeting

On October 3rd, 1997, Caltrans held a meeting with environmental interest groups in collaboration with BCDC and MTC. The goal of the meeting was to solicit the environmental concerns of these groups and provide them with information on the project purpose and need, alternatives, the environmental process, and construction schedules. In addition, information was mailed out to several of the groups that did not attend.

Public Hearings and Response to Comments on the DEIS

Following distribution of the DEIS, Caltrans and FHWA held four public hearings to give the public an opportunity to learn more about the project and to discuss the project with Caltrans staff. A copy of the DEIS was available for viewing at each meeting and also available on the Caltrans website. These hearings were held in Alameda, San Francisco, Contra Costa, and Solano counties on October 14, 15, 20 and 22, 1998, respectively. Approximately 174 people signed in as attending the hearings. Many other people who dropped in to view the exhibits or talk with staff did not sign the attendance sheets. Public and agency comments on the DEIS were accepted orally and in writing at the above-mentioned public hearings and accepted from other people by mail, facsimile, and e-mail. Approximately 700 individual comments on the DEIS were received, and responses are included in Volume 2 of the FEIS.

Other Public Outreach

Additional public involvement has included a total of 65 presentations given to various public groups, agencies, and professional associations over the course of the project. Four issues of a project newsletter were also distributed to over 3,500 interested parties including federal, state, and local agencies; elected and appointed officials; city and county staff; special interest groups; and the general public. The newsletters described the study alternatives, process and schedule, announced the community workshop series, and provided information about study progress and activities. Newsletters will continue to be produced and distributed periodically.

S.6 APPROVALS REQUIRED

The project requires the following approvals from federal, state, and regional agencies (see Appendix E for additional information):

- National Marine Fisheries Service - Incidental Harassment Authorization pursuant to the Marine Mammal Protection Act, Section 7 of the Endangered Species Act consultation, and essential fish habitat consultation;

- U.S. Army Corps of Engineers - Concurrence on the LEDPA and preliminary agreement on the conceptual mitigation plan for special aquatic sites. Combined Section 404 of the Clean Water Act Individual Permit and Section 10 of the Rivers and Harbors Act Permit; if appropriate, permit disposal of dredged materials at the Deep Ocean Disposal Site;

- U.S. Coast Guard - Approval of the location and placement of bridges under the General Bridge Act of 1946 and Section 9 of the Rivers and Harbors Act;
- U.S. Environmental Protection Agency - Concurrence on LEDPA and preliminary agreement on the conceptual mitigation plan for special aquatic sites;
- U.S. Fish and Wildlife Service- Section 7 of the Endangered Species Act consultation and preliminary agreement on the conceptual mitigation plan for special aquatic sites;
- San Francisco Bay Conservation and Development Commission (BCDC) - Major Permit pursuant to the McAteer-Petris Act and Federal Consistency Determination pursuant to the Coastal Zone Management Act;
- California Department of Fish and Game - Section 2090, Fish and Game Code requires participation in USFWS Section 7 of the Endangered Species Act consultation process;
- Regional Water Quality Control Board - Grant a certificate or waiver for compliance with Section 401 of the Clean Water Act;
- Compliance with Section 106 of the National Historic Preservation Act of 1966; and
- State Lands Commission - Permit for disposal of dredged materials if materials are disposed of on State lands.

S.7 CONTROVERSIAL ISSUES

Issues of controversy associated with the East Span Project include:

- Accommodation of rail service on the bridge;
- Disposal of dredged materials;
- Construction-period impacts on YBI;
- Future land use scenarios on YBI;
- Access ramps to and from YBI;
- The gateway to Oakland;
- The design of the bicycle/pedestrian path (replacement alternatives);
- Bridge alignment (build alternatives);
- The MOA;
- Safety of bridge design (replacement alternatives); and
- Bridge design parameters.

While these issues are not fully resolved, none of them would prevent the project from being implemented as the issues move toward resolution. The following is a summary of each issue and how they either have been or will be resolved.

Rail Service

The provision of rail service on the replacement alternatives is an issue raised by some East Bay communities and the City and County of San Francisco. Section 2.5 – Accommodation of Multi-Modal Strategies, identifies the fundamental obstacles to implementing rail service on the SFOBB as part of this project. However, it is likely that additional public discussion of rail service on the SFOBB and in the larger Transbay Corridor will continue since Phase 1 of the MTC Bay Bridge Rail Alternatives Study, completed in June 2000, concluded that replacement alternatives could accommodate light rail in the future.

Dredged Materials Disposal

Disposal of dredged material in the San Francisco Bay is a highly regulated activity. Many reviewers of the DEIS commented that it did not adequately address plans for disposal, quality of dredged material and how the project complied with the disposal regulation process.

Since publication of the DEIS, a Dredged Material Management Plan (DMMP) was prepared for the project and is included as Appendix M. The DMMP was developed in accordance with the Long Term Management Strategy (LTMS) that provides a policy framework and strategies for the placement of dredged material in the Bay region. The DMMP assesses impacts from dredging and disposal activities associated with construction and evaluates a range of reuse/disposal options for the dredged material. Some disposal options considered in the DMMP are not currently available, but may become available during project construction. Sediment sampling and analysis have also been completed to determine how much dredged material is suitable for unconfined aquatic disposal; a letter from the Dredged Material Management Office on October 31, 2000 outlines its conclusions regarding suitability (see Appendix G - Agency Consultation Letters). Final disposal options will be determined based on permitting processes, site availability and cost-effectiveness.

Construction-Period Impacts

Several agencies are concerned about the adequacy of Caltrans' efforts to reduce and/or mitigate construction period impacts.

Construction-period impacts are identified in Section 4.14 - Temporary Impacts During Construction Activities. Caltrans is coordinating with USCG, the CCSF, EBMUD and other agencies about their specific construction-period concerns, some of which are discussed in Section S.5.2 - Key Interagency Coordination. Caltrans will continue coordination with these agencies during project construction to reduce construction-period impacts to their facilities and operations.

YBI Land Use

The Naval Station Treasure Island is closed and the Navy is in the process of transferring its property to the CCSF. The Navy and the CCSF are concerned about

how the replacement alternatives will impact the land transfer and reuse plans outlined in the 1996 Draft Treasure Island Reuse Plan.

Based on preliminary information included in the CCSF's Draft Treasure Island Re-use Plan, potential land use impacts on YBI resulting from replacement alternatives are identified in Section 4.1.6 - Development Trends. The redevelopment concepts described in the 1996 Draft Reuse Plan can be generally accommodated with any of the East Span Project alternatives. The general reuse of Quarters 1 through 7, redevelopment of Building 262, development of a conference center, live/work units and artisan cottages can co-exist with Replacement Alternatives N-6, N-2, and S-4 or the Retrofit Existing Structure Alternative. Caltrans will coordinate with the CCSF to develop compensatory measures for documented losses in rental income from Quarters 1-7 incurred during the construction period and to establish protective measures to prevent construction-period damage to Quarters 1-7 and Building 262.

YBI Access Ramps

The CCSF requested that Caltrans provide new access ramps to YBI.

As part of the East Span Project, the eastbound on-ramp on the east side of the YBI tunnel would be rebuilt to current standards; Caltrans developed preliminary configurations for the other ramps for the CCSF to consider; however, the reconstruction and funding for other new ramps on YBI, which are owned by the Navy, are not part of the East Span Project. Future improvements to the other ramps are possible under a separate project because MTC has made them eligible for future funding in the Regional Transportation Plan.

Gateway to the City of Oakland

The City of Oakland's key concerns are the contribution of the aesthetic design of the East Span and the Oakland Touchdown area to a gateway entrance to the City and mitigation for impacts to the historic qualities of the existing East Span.

Caltrans has met with the City to discuss its concerns about the development of a gateway entrance at the Oakland Touchdown. A gateway entrance to the Oakland Touchdown area is beyond the scope of the East Span Project. Caltrans will cooperate with the East Bay Regional Park District in its planning program for the Gateway Park. It is assumed that EBRPD will include the City of Oakland as part of the park planning process. Please see Memorandum of Agreement discussion below for mitigation measures for impacts to the historic qualities of the existing bridge.

Design of Bicycle/Pedestrian path (replacement alternatives)

The replacement alternatives include the single bicycle/pedestrian path recommendation made by the Bicycle/Pedestrian Advisory Committee (BPAC) to the MTC Task Force, though the dual path was BPAC's first choice. BPAC's initial recommendation was a path on each structure at about the level of the roadway. This was not selected by MTC for reasons discussed in Section S.3.10 - Design Variations Considered But Withdrawn. Some members of the bicycling community expressed strong support for other path locations such as below-deck designs. Although complete consensus may not have been reached within the bicycling community, BPAC's recommendations have not changed and for purposes of identifying the preferred alternative, the adoption of one of BPAC's recommendations has resolved the issue.

Bridge Alignment (build alternatives)

Public agencies have expressed their opinions and preferences for certain build alternatives based on their views of potential impacts of construction period activities and/or the permanent structure. Agencies that have expressed a preference for a particular alignment include but are not limited to the CCSF, USCG, Navy, the City of Oakland, the Port of Oakland, BCDC, EBRPD, and EBMUD.

Caltrans has held several meetings with these agencies to date to discuss their preferences for a particular bridge alignment and what the impacts and mitigation would be under the Preferred Alternative.

Memorandum of Agreement

The Navy, the CCSF and the City of Oakland raised concerns about the contents of the MOA, which is intended to mitigate project-related impacts on historic structures. The Navy declined to sign, citing its opposition to northern replacement alternatives and disagreement with the determination of impacts on historic properties; it also requested that the CCSF be included as a concurring party. The CCSF declined to participate in the MOA process because it wanted further consideration of its proposed southern replacement alternative. The City of Oakland declined to sign, raising concerns that the mitigation established for the loss of the historic bridge was not adequate, and that Caltrans and FHWA should consider a variety of other kinds of mitigation suggested by the City.

FHWA and Caltrans considered the concerns raised by the Navy, the CCSF, the City of Oakland, and others regarding the MOA. In an effort to address these concerns, FHWA and Caltrans revised the MOA several times in consultation with the SHPO and ACHP. The SHPO and ACHP's signatures executing the MOA (see Appendix O of this FEIS) indicate agreement with the mitigation measures and the project's compliance with the provisions of Section 106.

Safety of Bridge Design (replacement alternatives)

The CCSF has raised concerns about the safety of the replacement bridge design. A study conducted by the ACOE determined that "the Caltrans design team is highly qualified, using state-of-the-art design methods and is moving along a path to design a bridge that meets the seismic performance criteria." (Final Report, Evaluation & Assessment of Proposed Alternatives to Retrofit/Replace the East Span of the San Francisco-Oakland Bay Bridge, U.S. Army Corps of Engineers, October 27, 2000.)

Bridge Design Parameters

For the East Span Project, Caltrans estimated the greatest rock motions from the Safety Evaluation Event (SEE). This is defined as an earthquake that generates the largest motions expected to occur at the bridge site once every 1,500 years (a 1,500 year return period or a 10 percent probability of occurring during the structure's 150 year expected life). The Seismic Safety Peer Review Panel and the EDAP both accepted and agreed that the bridge should be designed for these SEE ground motions.

A report prepared by the ACOE later concluded that in using these standards, the performance of the bridge could not be predicted in the event of a Maximum Credible Earthquake (MCE), which it defined as the largest earthquake reasonably capable of occurring based on current geological knowledge. The ACOE report erroneously stated that an MCE would be a greater seismic event than a SEE.

During a meeting held on December 7th, 2000 to discuss seismic safety evaluations for the East Span, the Ad Hoc Committee on Ground Motions made a presentation to EDAP about the difference between MCE and SEE. The Ad Hoc Committee determined that ACOE's conclusion regarding SEE and MCE was based on an error in one of the ACOE's tables and that MCE motions fall well below the SEE motions in all relevant data ranges, particularly during the initial shaking. As a result, the Ad Hoc Committee determined that Caltrans is designing a replacement bridge to the higher SEE standard.

S.8 MAJOR UNRESOLVED ISSUES WITH OTHER AGENCIES

Partial Restoration of Barge Access Channel (northern alternatives)

As part of its eelgrass mitigation, Caltrans proposes to fill in a portion of the barge access channel following all construction activities. Raising the level of the Bay bottom to pre-construction elevations would allow for on-site restoration of impacted eelgrass and increase the likelihood of successful eelgrass recolonization. The ACOE and the Regional Water Quality Control Board could permit this mitigation measure. Under its current policies, BCDC would not. However, BCDC is in the process of re-evaluating and revising its marshes and mudflats policies and the revised policies may allow the use of dredge material for restoration/creation of eelgrass beds within its jurisdiction. If the Commission does not change its policies prior to permitting the Bay Bridge, Caltrans would revise its mitigation proposal to eliminate the use of dredged material and allow the channel to fill in naturally.

Bicycle Access to YBI from Path (replacement alternatives)

The CCSF has expressed concerns about bicycle and pedestrian access onto Yerba Buena Island from the western terminus of the bicycle/pedestrian path on the East Span. While the CCSF's Draft Reuse Plan for YBI proposes bicycle and pedestrian modes as the primary modes of transportation on YBI and Treasure Island, bicycle and pedestrian facilities on YBI are currently very limited. Caltrans would consult with the Navy and/or other property owners on YBI about their interest in having directional signage installed for path users on the bridge. If consultation results in agreement on the nature and placement of the signs, Caltrans would install the signage within its right-of way.

Public Access at the Mitigation Site for Special Aquatic Sites

In consultation with the resource agencies, Caltrans proposes to provide on and off-site mitigation for impacts to special aquatic sites. For the off-site mitigation, BCDC staff has requested that Caltrans provide public access by completing a portion of the Bay Trail. BCDC's policies require that a project provide the maximum feasible public access to the Bay consistent with the project. For any of the replacement alternatives, for which the off-site mitigation is a component, Caltrans would provide a bicycle and pedestrian path with belvederes from the Oakland Touchdown to Yerba Buena Island, and a public access staging area with parking at the Oakland Touchdown. These public access facilities are a significant investment and are unprecedented in the Bay Area in terms of cost. Caltrans does not propose any public access at, through or around its mitigation area; Caltrans has concluded that public access at the mitigation site is inconsistent with providing high quality habitat for resident and migratory wildlife. Providing public access at the mitigation area, as requested by BCDC staff, may also require the placement of fill in jurisdictional wetlands. Caltrans will continue to work with BCDC through the permitting process to address this public access issue.

S.9 FINAL STEPS

- FHWA will issue a Record of Decision (ROD) to identify its selected alternative and present the basis for its decision in selecting that alternative;
- Notification and issuance of the Section 404 Individual Permit/Section 10 Permit by the ACOE; ACOE issues permit for disposal of dredged material at Deep Ocean Disposal site, if needed;
- Notification and issuance of Bridge Permit by the USCG;
- Notification and issuance of Incidental Harassment Authorization by NMFS;
- Issuance of Water Quality Certification or waiver by Regional Water Quality Control Board;
- Issuance of Major Permit and Federal Consistency determination by BCDC; and
- Continue to seek resolution of unresolved issues with concerned parties.

Table S-3 Summary of Impacts and Mitigations-Build Alternatives

Community				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Employment	The estimated total number of human employment years is projected to be 4,290.	The estimated total number of human employment years is projected to be 4,232.	Same as N-2	The estimated total number of human employment years is projected to be 2,356.
Community Services	No impact	No impact	Due to insufficient clearance between the bridge structure and EBMUD's existing service road, EBMUD's service trucks would be prevented from accessing its dechlorination facility at the west end of the Oakland Touchdown requiring relocation of the service road and/or the dechlorination facility. The road could be relocated to the north, south, via a tunnel or on an overpass. The dechlorination facility could be moved to the east. Potential impacts of relocation are reduced visual public access to the Bay for westbound motorists approaching the bridge if an overpass is constructed, fill in the Bay (approximately 13,650 cubic meters (18,000 cubic yards) and 0.36 hectare (0.9 acre), drainage problems, and/or modifications to the design and/or operation of EBMUD's discharge system. All relocation options entail increased construction and maintenance costs. **Mitigation-** Caltrans would work with EBMUD to relocate the service road and/or the dechlorination facility to maintain EBMUD's operations. Caltrans would obtain necessary permits/permit amendments, fund relocation costs, and implement any necessary mitigation. Caltrans would assure continual operation of EBMUD's discharge system during relocation.	No impact

Existing Land Use				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Former Navy Building 213 on YBI	Would displace Building 213 (which currently serves as storage for one fire truck) on YBI. **Mitigation-**If requested by the Navy, Caltrans will replace Building 213 with a structure of like size, construction materials and quality, built to current building codes. The Navy would need to provide a suitable site for the replacement of Building 213 outside State right-of-way.	Same as N-6	No impact	No impact on Navy buildings.
USCG Buildings on YBI	Would displace buildings 30 (storage), 40 (administration), 75 (vacant), and 270 (vacant). **Mitigation-**Caltrans would provide replacement buildings of like size, construction materials and quality, built to current building codes. The USCG would need to provide suitable sites for the replacements outside State right-of-way.	Same as N-6	Same as N-6	No impacts to USCG buildings.
Land Use on USCG YBI facility	No permanent impact on USCG usable land area.	Same as N-6	Footing and support columns of new bridge would span approximately 1.5 hectares (3.8 acres) of 2 hectares (5 acres) of USCG usable land area. USCG land under bridge could be developed subject to review and approval by Caltrans.	Same as N-6
Land Use at the Oakland Touchdown Area	Would require permanent displacement of 0.2-hectare (0.5-acre) of the City of Oakland-designated Resource Conservation Area north of the existing bridge. New upland/aquatic interface areas would be improved on-site for wildlife.	Same as N-6	See Community Services impacts of Replacement Alternative S-4.	No impact

Section 4(f) Evaluation

Section 4(f) of the Department of Transportation Act of 1966 specifies that "[t] he Secretary [of Transportation] may approve a transportation program or project.... requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of a historic site of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area, refuge or site) only if 1) there is no prudent and feasible alternative to using that land; and 2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use." Permanent 4(f) uses are summarized below; temporary 4(f) uses are discussed on page S-38.

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Use of Resources Protected by Section 4(f) of the Department of Transportation Act	Removal of existing East Span of SFOBB. **Mitigation-**Caltrans would comply with the Memorandum of Agreement executed pursuant to the National Historic Preservation Act (see Appendix O).	Same as N-6	Removal of existing East Span of SFOBB and occupation of about 3.0 hectares (7.4 acres) of the 5.9-hectare (14.7-acre) proposed Gateway Park. **Mitigation-**For the loss of the bridge, Caltrans would comply with the Memorandum of Agreement executed pursuant to the National Historic Preservation Act. To minimize harm to the proposed park, Caltrans would replace public shoreline access for loss of proposed parkland.	Substantial modifications to the existing East Span of SFOBB. On YBI, enlarged column would incorporate about 0.001-hectare (0.002-acre) of the grounds of the Senior Officers' Quarters Historic District. **Mitigation-**Caltrans would comply with the Memorandum of Agreement executed pursuant to the National Historic Preservation Act.

Development Trends

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Treasure Island Draft Reuse Plan Consistency **The CCSF has a conceptual proposal under the 1996 Treasure Island Draft Reuse Plan to develop commercial and residential properties on the east side of YBI. The Draft Plan was prepared for the Office of Military Base Conversion, Planning Development, City and County of San Francisco, and the San Francisco Redevelopment Agency.**	Bridge would span 1.1 hectares (2.9 acres) of 3.2 hectares (7.8 acres) of developable land. Air space under bridge could be leased for development by the CCSF per review and approval by Caltrans. The number of live/work units and the size of the conference center would be reduced due to location of bridge footings. Proposed development would require Bay Plan amendments and a federal consistency determination from the Bay Conservation and Development Commission (BCDC) pursuant to the Coastal Zone Management Act. N-6 is consistent with the transportation element of the CCSF reuse plan.	Same as N-6	Bridge would span 0.6-hectare (1.4 acres) of 3.7 hectares (9.1 acres) of developable land; approximately 0.8-hectare (2.0 acres) of land occupied by existing span would become available for development. Otherwise, same as N-6.	No permanent impacts on the CCSF's redevelopment concepts described in the 1996 Treasure Island Draft Reuse Plan. Bridge would continue to span 0.2-hectare (0.6-acre) of 3.2 hectares (7.8 acres) of developable land.

Development Trends (continued)				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Port of Oakland **BCDC amended its Seaport Plan and Bay Plan in January 2001, which included the deletion of the port priority use area at the Bay Bridge Site (Oakland Touchdown area).**	No permanent impact on the Port of Oakland expansion plans.	Same as N-6	Same as N-6	Same as N-6
Oakland Touchdown Area Proposed Gateway Park **Reuse plan of Oakland Base Reuse Authority (OBRA) has designated 5.9 hectares (14.7 acres) at the Oakland Touchdown area as a future public park. Led by East Bay Regional Park District, park planning agencies include the City of Oakland, National Park Service, Port of Oakland and BCDC.**	Would not involve use of the proposed Gateway Park. At the closest point, the bridge structure would be approximately 46 meters (151 feet) from the OBRA-designated park boundary.	Same as N-6	The structure would bisect and occupy 3.0 hectares (7.4 acres) of 5.9 hectares (14.7 acres) from the OBRA-designated park.	Would not involve use of proposed Gateway Park. At the closest point, the bridge structure would be approximately 30 meters (98 feet) from the OBRA-designated park boundary.
BDCD Permit 11-93 **As part of the I-880/Cypress Freeway Replacement Project, Caltrans is required to provide public access to the Bay at the Oakland Touchdown area. These access areas, or overlooks, and other improvements are required by BCDC to maximize public access to the west end of the Oakland Touchdown area.**	Consistent with Permit 11-93 as amended. Pursuant to the amended permit, the final location and design of public access improvements would be jointly planned in coordination with the East Span Project subject to BCDC approval. Should it prove infeasible to construct some or all of the improvements required under Permit 11-93, Caltrans may pay BCDC an in-lieu fee.	Same as N-6	Same as N-6	Same as N-6

Transportation				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Vehicular Transportation	Would retain five eastbound and five westbound traffic lanes on the East Span. No long-term impacts to local traffic, transit, or maritime traffic. Addition of shoulders may reduce non-recurrent congestion caused by accidents or stalls and would result in fewer lane closures for maintenance operations. The existing Caltrans maintenance road at the Oakland Touchdown area would be realigined but there would be no loss of access.	Same as N-6	Same as N-6; however S-4 would require modification of existing access patterns on the local roadways of the Oakland Touchdown area. Realigned access roadways would serve existing facilities and future park development, with the exception of the EBMUD dechlorination facility where restricted access would require relocation of the service road and/or dechlorination facility. (Mitigation for this impact is discussed in the Community Services section on page S-22).	Traffic operations would remain the same as under existing conditions.
Non-Motorized Traffic: Bicycles and Pedestrians	Provision of bicycle/pedestrian path between Oakland and YBI would be consistent with the CCSF's Treasure Island Draft Reuse Plan, BCDC's Bay Plan, City of Oakland's Pedestrian and Bicycle Master Plan and Association of Bay Area Government's Bay Trail Plan.	Same as N-6	Same as N-6	Would not implement a bicycle/pedestrian path on East Span and is therefore inconsistent with local plans listed under N-6.
Parking on YBI and the Oakland Touchdown area	No impact	No impact	No impact	No impact
Marine Traffic	No impact	No impact	No impact	No impact
Air Traffic	Would change existing obstruction markings and lighting. Federal Administration (FAA) form 7460-1, "Notice of Proposed Construction or Alteration," would be filed with the FAA, which would disclose the location and height of a cable-supported tower. Warning lights are required because the tower would exceed 61 meters (200 feet), which is FAA's maximum height for which warning lights are not required.	Same as N-6	Same as N-6	No impact

Visual

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Removal of Vegetation and Slope Disturbance on Yerba Buena Island and the Oakland Touchdown Area	The appearance of the hillside to the south of the East Span may be permanently altered, and approximately 350 mature trees (mostly eucalyptus) on eastern facing slopes of YBI and 71 mature trees (mostly pine) at the Oakland Touchdown area would be removed. **Mitigation-** Caltrans would approve a construction access plan detailing grading, access roads, vegetation removal, and location of equipment platforms. Construction limits on YBI would protect select vegetation and screening to the maximum extent feasible. A re-vegetation plan would include the planting of mature trees, monitoring, and replanting as necessary to return disturbed acres to a natural appearance and to establish visual screening of the bridge. Re-planted vegetation would require approximately ten years to reestablish itself to current density. Caltrans would develop a master-planting plan in coordination with local agencies to be implemented within two years after bridge construction is completed.	Same as N-6	Construction would result in removal of approximately 325 mature trees at YBI (mostly eucalyptus) and approximately 12 mature trees at the Oakland Touchdown area (mostly pine). **Mitigation-**Same as N-6	Construction would result in removal of approximately 150 mature trees at YBI (mostly eucalyptus). **Mitigation-**Same as N-6
Visual Image Types	For the main span, the self-anchored design variation would result in the most favorable impact upon visual quality regardless of viewpoint location due to an increase in the vividness of the span and overall unity of the view. The skyway design variation would result in the least favorable impact upon visual quality due to a reduction in the vividness and intactness of the span.	Same as N-6	Same as N-6	Would have a negligible impact on visual quality from distant viewpoints, as the structural elements added to the East Span would not be perceptible. For some of the closer viewpoints, the Retrofit Alternative would have a minimally adverse impact on viewers, as the additional structural elements (new piers and strengthened existing piers) would obstruct views underneath the bridge.

Air Quality				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Permanent Air Quality Impacts	No impact. Project would not increase roadway capacity.	Same as N-6	Same as N-6	Same as N-6

Noise and Vibration				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Noise	On YBI, future predicted peak noise levels at certain locations would exceed FHWA Noise Abatement Criteria (NAC), but would generally decrease by 1 to 14 dBA compared to the existing noise levels. At the Oakland Touchdown area, future users of the proposed Gateway Park could experience slightly higher noise levels (increases of 1-2 dBA) in the eastern portion of the park. Increases of less than 3 dBA are generally not perceptible. Noise levels at the western end of the park would be 3 to 6 dBA lower than existing noise levels.	Same as N-6.	On YBI, peak noise levels at certain locations would exceed FHWA NAC, but would decrease by 1 to 14 dBA compared to the existing noise levels. At the Oakland Touchdown area, future users of the proposed Gateway Park could experience slightly higher noise levels (increases of 2 to 3 dBA) in the eastern portion of the park. These increases should not be perceptible. Noise levels at certain locations in the western end of the park cannot be quantified using the noise model because the bridge would be directly over the area, but the bridge deck would likely shield the area from traffic noise on the structure above.	No change from existing noise levels.
Noise on the bike/pedestrian path	Future predicted noise on the path would be approximately 82-84 dBA. Exposure to typical noise levels on the bridge would not cause hearing problems for path users.	Same as N-6	Same as N-6	Retrofit Alternative would not include a bicycle/pedestrian facility.

Noise and Vibration (continued)				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Vibration	Vibration levels from traffic operations (i.e. heavy-truck traffic) would probably be below the levels of human perception at distances of more than 30 meters (100 feet) from bridge support columns. Vibration levels at nearby locations, including the film studios on TI, are predicted to remain below architectural damage criterion and human perception levels.	Same as N-6	Same as N-6	Same as N-6; however vibration levels may be slightly than those resulting from replacement alternatives because this alternative would not include use of higher-mass concrete on bridge decks.

Hazardous Waste Sites				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Hazardous Waste Sites and Materials	May impact eight hazardous waste sites on YBI and three on the Oakland Touchdown area. **Mitigation-**Off-site disposal would be at an appropriate landfill or recycling facility. Licensed waste haulers would transport hazardous soil.	Same as N-6 **Mitigation-**Same as N-6	May impact nine hazardous waste sites on YBI and four on the Oakland Touchdown area. **Mitigation-**Same as N-6	May impact five hazardous waste sites on YBI and two on the Oakland Touchdown area. **Mitigation-**Same as N-6

Geology, Soils and Seismicity				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Soil and Rock Stability Settlement	Pre-existing slope stability and erosion problems on YBI adjacent to the USCG facility. An incident of slope failure could interfere with USCG operations by obstructing the USCG road next to the facility. In addition, a temporary road would be required through an existing slope approximately 35 meters (115 feet) south of Building 206 and Quarters 8. **Mitigation-** Caltrans would ensure that the project does not exacerbate pre-existing problems within Caltrans' right-of-way or its temporary construction easement during or after construction. Consultation with the USCG and collection of information on slope stability prior to and during construction would be conducted. Caltrans will require the contractor to prepare a conceptual plan for slope stability and erosion control on the hillside above the USCG facility and solicit comments on the plan from the USCG. In order to minimize slope impacts associated with the temporary road, temporary retaining walls would be used. Excavation required for construction of the walls would be filled in. At the Oakland Touchdown area, the potential for liquefaction of the fill that lies beneath the water table exists. **Mitigation-**At-grade approach structures would be created by placing embankment fill on certain sections of the landfall that may be prone to settlement.	Same as N-6	Same as N-6	No impact

Geology, Soils and Seismicity (continued)				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Seismicity	Meets lifeline criteria. Expected to withstand an MCE on the San Andreas or Hayward fault. Design criteria include non-collapse and serviceability of structures when subjected to ground motions during a seismic event.	Same as N-6	Same as N-6	Does not meet lifeline criteria. It is expected that the retrofitted main span would withstand an MCE or smaller event however it is anticipated that in the event of an MCE, the retrofitted East Span would experience damage to truss members in the steel superstructure.
Tsunamis	The structural design on the Oakland Touchdown area would include the capability of resisting water/wave/current-induced loading.	Same as N-6	Same as N-6	Same as N-6

Water Quality				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Water Quality	Not expected to increase concentration levels of pollutants commonly found in highway runoff nor is the design expected to elevate the levels of less common constituents. A reduction in sandblasting and painting operations and use of non-lead based paint on steel portions of the new span would decrease discharge of lead debris and residue into the Bay. Addition of shoulders would improve response time for emergency vehicles, maintenance crews and hazardous spills response teams, minimizing discharges into the Bay. No impacts to ground water quality.	Same as N-6	Same as N-6	No impact. The current practice of sweeping the bridge decks would continue and storm water would continue to discharge directly into the Bay.

Permanent Change in Volume and Area of Other Waters of the U.S. as defined by ACOE

Under the Clean Water Act, the ACOE considers fill in Other Waters of the U.S. to be solid material placed in jurisdictional waters below the Mean High Water Line (MHW), which is approximately +1.42 meters National Geodetic Vertical Datum (NGVD) (+4.63 feet) at Yerba Buena Island and the Oakland touchdown area. The analysis of fill in Other Waters of the U.S. does not include fill in special aquatic sites. Impacts to special aquatic sites are addressed separately.

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Change in Volume to Other Waters of the U.S.	Would result in a net increase of 386,000 cubic meters (504,900 cubic yards).	Same as N-6	Would result in a net increase of 368,300 cubic meters (481,700 cubic yards).	Would result in a net decrease of 26,300 cubic meters (34,200 cubic yards).
Change in Surface Area to Others Waters of the U.S.	Would result in a net decrease of 0.26 hectare (0.63 acre).	Same as N-6	Would result in a net decrease of 0.93 hectare (2.31 acre).	Would result in a net decrease of 1.70 hectare (4.19 acre).

Permanent Change in Volume and Area of San Francisco Bay as defined by BCDC

Under the McAteer-Petris Act, BCDC considers Bay fill to be any solid, pile-supported, floating, cantilevered or high-level suspended material that is placed bayward of the Mean High Tide Line (MHTL) which is approximately +0.82 meters NGVD (+2.68 feet) at Yerba Buena Island and +0.84 meters NGVD (+2.77 feet) at the Oakland Touchdown area. Unlike the ACOE, the analysis of fill under BCDC's jurisdiction includes fill in special aquatic sites such as wetlands, eelgrass beds and sand flats.

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Change in Volume of the Bay	Would result in a net increase of 352,400 cubic meters (460,900 cubic yards).	Same as N-6	Would result in a net increase of 367,500 cubic meters (480,600 cubic yards).	Would result in a net decrease of 16,500 cubic meters (21,300 cubic yards).
Change in Surface Area of the Bay	Would result in a net decrease of 13.96 hectares (34.51 acres).	Would result in a net decrease of 13.03 hectares (32.40 acres).	Would result in a net decrease of 12.30 hectares (30.40 acres).	N/A

Special Aquatic Sites

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Sand flats **The sand flats located within the project area are along the north side of the Oakland Touchdown area and along the southeast side of Yerba Buena Island, east of the U.S. Coast Guard facility. Their functions are feeding, and roosting habitat for a variety of shorebirds.**	Permanent impacts to 1.36 hectares (3.36 acres) at the Oakland Touchdown area. **Mitigation-**On-site restoration of a portion of sand flats following construction; off-site creation of tidal marsh ecosystem.	Same as N-6	Permanent impacts to 0.01 hectare (0.03-acre) at YBI. **Mitigation-**Off-site creation of tidal marsh ecosystem.	No impact

Special Aquatic Sites (continued)

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Eelgrass Beds **Five areas of eelgrass beds have been identified in the project area. There are two on the north shore of YBI, two on the south shore of YBI and one on the north shore of the Oakland Touchdown area. Their functions are food source, nursery, spawning ground, and/or habitat for resident and migratory species of birds, fish, and invertebrates.**	Permanent impacts to 0.21-hectare (0.52 acre) at the Oakland Touchdown area and 0.01-hectare (0.03 acre) at YBI. **Mitigation-**Minimization of impacts through a turbidity control program; harvesting eelgrass from the barge access channel and replanting in adjacent beds as a pilot program; restoring bathymetry of portions of barge access channel and replanting with eelgrass to facilitate eelgrass colonization; off-site creation of tidal marsh ecosystem.	Same as N-6	Permanent impacts to 0.16-hectare (0.40-acre) at YBI. **Mitigation-**Minimization of impacts through a turbidity control program; harvesting eelgrass from the barge access channel at YBI and replanting it in adjacent beds as a pilot program; restoring bathymetry of portions of barge access channel and replanting with eelgrass to facilitate eelgrass colonization; off-site creation of tidal marsh ecosystem.	No impacts
Wetlands **The tidal wetlands in the project study area possess a moderate level of functions and values since they are remnant wetlands surrounded by non-native species that do not provide extensive habitat for wildlife. The two non-tidal wetlands in the project area possess very limited functions and values due to the lack of wetland species diversity and human disturbance.**	No impact Avoidance of habitat by marking the wetlands as Environmentally Sensitive Areas (ESAs)	Same as N-6	Permanent impacts to 0.05-hectare (0.12-acre) of non-tidal wetlands on the south side of the Oakland Touchdown area from construction. **Mitigation-**Off-site creation of non-tidal wetlands.	Same as N-6

Special Status Species				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Double-Crested Cormorant **Protected by Migratory Bird Treaty Act.**	Dismantling the existing structure would remove nesting sites. **Mitigation-**Nesting habitat would be constructed on the new bridge.	Same as N-6	Same as N-6	No impact
Peregrine Falcon **Removed from Federal Endangered Species List. Protected by State Endangered Species Act and Migratory Bird Treaty Act.**	Dismantling the existing structure would remove nesting site. **Mitigation-**None required: peregrine falcon is likely to nest on a replacement bridge. Santa Cruz Predatory Bird Research Group would continue monitoring and off-site release efforts to avoid potential impacts during scheduled maintenance activities.	Same as N-6	Same as N-6	No impact

Other Natural Communities				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Shorebird Habitat	Would result in a small loss of sand flats that provide shorebird foraging and roosting habitat on the north side of the Oakland Touchdown area. However, due to the small area impacted, it is not anticipated that this will adversely impact shorebirds. **Mitigation-**See construction period mitigation.	Same as N-6	Would result in a small loss of upland area on the south side of the Oakland Touchdown area that is known to provide roosting habitat for shorebirds during the winter months. **Mitigation-**See construction period mitigation.	No impact
Coast Live Oak Woodlands	Would result in the loss of six coast live oak trees on YBI. **Mitigation-**Replacement of trees per the CCSF tree ordinance at a 3:1 ratio. Due to the root structure of mature oak trees, the replacement trees may be smaller than those displaced.	Same as N-6	Same as N-6	No impact

Historic Properties

In accordance with Section 106 of the National Historic Preservation Act, measures to mitigate project effects on historic properties have been stipulated in a Memorandum of Agreement (MOA) among the Federal Highway Administration (FHWA), U.S. Coast Guard, the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP), with Caltrans as a concurring party. The Navy, local governments, and Native Americans were also asked to participate in the development of mitigation measures and invited to sign the MOA as concurring parties. Mitigation measures for the impacts below are identified in the MOA (Appendix O). The following discussion includes permanent and construction-period impacts.

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Archaeological Site CA-SFr-04/H on YBI	Columns for eastbound and westbound permanent structures and one column for the westbound temporary detour would disturb site.	No impact	North half of site removed due to westbound temporary detours. **Mitigation-**Same as N-6	Excavation to strengthen Column YB3 would disturb site. **Mitigation-**Same as N-6
Building 262 (Torpedo Building)	Impact due to "visual, audible, or atmospheric elements that are out of character with the property." In addition, construction activities in the vicinity and overhead could result in inadvertent damage.	Same as N-6	No impact	No impact
Senior Officers' Quarters Historic District (includes Quarters 1 to 7 and Buildings 83, 205, and 230).	Views from Quarters 1 would be slightly modified by placement of a concrete column and removal of existing steel column. Footings for temporary detours would be constructed within the district. The affected areas would be restored to their prior condition at the completion of the project.	Same as N-6	Would not modify the views from Quarters 1, otherwise same as N-6.	The encasement of steel columns in concrete at Piers YB2 through YB4 would introduce a visual intrusion.
Quarters 8, 9, 10 and Building 267 (garage associated with Building 10).	No impact	Same as N-6	Same as N-6	Same as N-6
Existing East Span of SFOBB	Removal of bridge and two ancillary buildings (Caltrans garage and electric substation on YBI).	Same as N-6	Same as N-6	Alteration of bridge.
Key Pier Substation (Oakland Touchdown area)	Removal of existing East Span, to which substation contributes; station itself not removed or altered, but its historic association with the SFOBB would be lost.	Same as N-6	Same as N-6	No impact

Scientific Resources

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Scientific Resources	Potential for disturbance of paleontologic resources during in-Bay construction of new piers and footings. **Mitigation-**Should paleontological resources be discovered, Caltrans would ensure that the provisions of the California Public Resources Code Section 5097.6 are implemented using their "Interim Guidance for the Identification, Assessment, and Treatment of Paleontological Resources," July 1991.	Same as N-6	Same as N-6	Potential for disturbance of paleontologic resources during in-Bay construction to retrofit existing piers and footings. **Mitigation-**Same as N-6

Utilities

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Impacts to Utilities	Utilities on the existing East Span would be relocated to the replacement span. Caltrans or the utility owner will pay relocation costs depending on agreements made prior to relocation. Submarine utilities would be avoided to the greatest extent possible. If utilities cannot be avoided, they would be protected in place or relocated. Caltrans and the contractor would assume responsibility for damage and payment for documented income loss and difference in power costs. A temporary span of the land portion of the EBMUD outfall facility may be required and would be coordinated with EBMUD.	Same as N-6	Same as N-6; however a special bridge design would be required to sufficiently span the outfall facility in order to prevent construction period damage.	Utilities on the existing East Span would be maintained. Otherwise, same as N-6.

Energy				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Energy	No long-term impacts.	Same as N-6	Same as N-6	Same as N-6

Construction Period Impacts

The following are construction period impacts which would occur during construction of a replacement or retrofit alternative. These impacts are temporary and are not anticipated to have environmental impacts beyond completion of the project.

Construction Period Community Impacts				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Community Impacts	The desirability of Quarters 1-7 would be reduced during construction due to noise, lighting, and visual impacts of construction. Building 262, currently vacant and in disrepair, would be accessible but would not be usable due to adjacent construction activity. **Mitigation-**Caltrans would reimburse the CCSF for documented losses in rental income from Quarters 1- 7. A pre- and post-construction survey of Quarters 1- 7 and Building 262 would be conducted and construction-related damage would be repaired as necessary. Protective measures would be developed in consultation with property owners.	Same as N-6	Same as N-6	Same as N-6; however, causes for motorist delays on YBI and the Oakland Touchdown would be limited to the use of local streets for transport of workers, equipment, and materials.

Construction Period Community Impacts (continued)				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Safety and Security	Heavy vehicle movements, possible hazardous waste excavation and transport, and construction site activity could create safety concerns for construction workers and members of the public on YBI and the Oakland Touchdown. **Mitigation-**Best construction management practices would be in place to ensure the safety of construction workers, local employees, and residents during construction.	Same as N-6	Same as N-6	Same as N-6
Temporary use of Resources Protected by Section 4(f) of the Department of Transportation Act	On YBI, four to six column footings of a temporary detour would be placed in landscaped or paved areas of the Officers' Quarters Historic District. **Mitigation-**Caltrans would protect historic buildings in the senior Officers' Quarters Historic District during construction and restore disturbed areas following construction.	Same as N-6	Same as N-6	No impact

Construction Period Transportation Impacts

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Impacts to traffic on the East Span	Lane or bridge closures would be necessary to connect the new structure and the existing viaduct at YBI. These closures could result in some traffic delays on the East Span and its approaches. Additional delays could occur as "rubbernecking" drivers watch construction of the new superstructure and dismantling of the existing bridge from the new bridge. **Mitigation-**Caltrans is continuing to investigate lane and bridge closures in an effort to simultaneously minimize public inconvenience, facilitate construction and maximize public safety. Closures would be timed during off-peak hours to the extent feasible and Caltrans would implement a traffic management plan to manage impacts to traffic.	Same as N-6	Same as N-6	Would result in longer and more frequent lane closures (i.e., almost every day during the construction period), compared to the replacement alternatives. **Mitigation-**Same as N-6

Construction Period Transportation Impacts (continued)				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Impacts to Traffic Circulation on YBI	Occasional congestion could occur on YBI due to construction-related vehicle traffic on local roadways, an increase in the volume of vehicles entering and exiting the island, closure of westbound on-ramp and eastbound off-ramp on the east side of the island, closure of Southgate Road, and modifications to the USCG access road, Macalla Road, and the road that provides access to Building 262. Also, there would be no public access to the parade grounds and a temporary restriction of access to Building 267 (the garage at Quarters 10), for about a day. **Mitigation-**The contractor would construct a detour around the column foundations to keep Macalla Road open or provide another travel way for USCG personnel and column construction could be staged so that entrances to the USCG Station would be open at all times. Temporary detours would be constructed and flaggers employed to ensure motorist safety for USCG vehicles in the construction zone. Barges would deliver wide and oversized construction loads, where possible. Caltrans would limit contractor parking to the temporary construction easement.	Same as N-6	Same as N-6	Same as N-6; however, would not restrict access to Building 267.
Impacts to pedestrian circulation on YBI	Would displace stairway linking USCG facility with bus stop on SFOBB. **Mitigation-**Caltrans would construct new stairway after consulting with USCG, Navy, and the CCSF about appropriate site. Construction-period shuttle service would be provided.	Same as N-6	No long-term impact on stairway linking USCG facility with bus stop on SFOBB. Stairway would be closed during construction. **Mitigation-**Construction-period shuttle service would be provided.	Construction may require the temporary closure of stairway linking USCG facility with the bus stop on SFOBB. **Mitigation-** Construction-period shuttle service would be provided in the event of a closure.

Construction Period Transportation Impacts (continued)				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Impacts to Traffic Circulation on the Oakland Touchdown area	Would require closure of access road on north side of I-80, eliminating shoreline access for authorized vehicles west of Radio Point Beach. Construction-related vehicle traffic could potentially cause minor delays to other traffic and two AC Transit lines. No mitigation is recommended for potential minor delays.	Same as N-6	Same as N-6; however, would not require closure of shoreline access road used by authorized vehicles.	Same as S-4
Marine Operations	Non-project-related marine traffic would be diverted from areas of construction. Barges, other construction vessels, and falsework would restrict the navigation opening. Temporary closures of portions of the navigation opening could occur. **Mitigation-**Caltrans would consult with the USCG to implement a vessel warning system for periods when construction vessels are placed in the water within the bridge construction zone. Notification to mariners and other requirements will be specified in the permit completed for the USCG.			

Construction Period Visual Impacts				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Visual Impacts on YBI	Visual changes for residents and users of YBI due to location of temporary detour columns, construction staging, lighting equipment and the reduction of some Bay views from Quarters 1-7. Changes would not substantially alter the character of the Bay or YBI. **Mitigation-**To reduce glare from lighting used during nighttime construction activities, Caltrans would require contractor to direct lighting onto the immediate area under construction only and avoid shining lights toward residences and marine traffic.	Same as N-6	Same as N-6	Same as N-6, including possible visual impacts from the use of scaffoldings.
Visual Impacts on the Oakland Touchdown area	Visual changes due to construction activities and staging.	Same as N-6	Same as N-6	Same as N-6

Construction Period Air Quality Impacts				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Air Quality Impacts	Would contribute to area air pollutants emissions during most stages of construction. The largest sources of anticipated pollutants would be dust generated by excavation, grading, and other ground disturbing activities on YBI and the Oakland Touchdown area and exhaust emissions from equipment and marine vessels. Because emissions would vary from day to day depending on construction activity, construction location, and distance to receptors, an exact estimate of total construction emissions and impacts are not possible. Measures to reduce emissions during construction, as specified in Caltrans' Standard Specifications, would be included in the contract specifications. These measures include: watering exposed soil surfaces, covering trucks transporting dust producing material, reducing-construction vehicle travel speeds on unpaved surfaces, maintaining equipment per manufacturers' specifications and conforming to all air pollution regulations. Because these measures will be included in the contractor specifications, no mitigation is proposed.	Same as N-6	Same as N-6	Same as N-6

Construction Period Noise and Vibration Impacts				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Noise Impacts	During construction of the temporary eastbound detour, noise levels at Bachelor Enlisted Quarters may increase by ten dBA over existing conditions. During pile driving operations, noise levels at Quarters 8, the Bachelor Enlisted Quarters Building 240, and Building 262 may increase by 19-20 BA and 7 dBA at the Treasure Island film studios. **Construction-period Noise Abatement-**All construction equipment would conform to provisions in Section 7-1.01I of the latest edition of Standard Specifications. The contractor would be required to comply with local noise control ordinances to the extent practicable. Caltrans would continue to consult with the Coast Guard to identify and implement feasible and reasonable measures to reduce construction-related noise levels at USCG facilities. In addition, Caltrans is continuing to investigate the possibility of limiting the hours for pile driving to reduce the construction noise impacts to other residents of YBI and TI.	Same as N-6	Same as N-6	During rivet removal operations, noise levels at USCG Building 40 (administration) and Navy Building 213 (storage for 1 fire truck) may increase by 3-16 dBA over existing conditions. Pile driving would occur in closest proximity to Quarters 1 and noise levels at that location might increase by 24 dBA. **Construction-period Noise Abatement-**Same as N-6.
Traffic Noise from temporary detours associated with Replacement Alternatives	Noise generated by detour traffic is anticipated to be similar to noise from existing traffic. Slight increases of 1-2 dBA at certain locations would generally not be perceptible.	Same as N-6	Same as N-6	No detours structures required.

Construction Period Noise and Vibration Impacts (continued)

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Vibration Impacts	Due to distance of buildings from construction activities, no architectural damage is expected to occur as a result of vibrations. Due to distance from construction activities, vibrations should not be perceptible at the Treasure Island film studios. **Abatement-**Historic properties on YBI would be monitored for construction related damage including the use of vibration measuring devices on buildings. Caltrans would photographically document the condition of these buildings prior to the start of construction to establish the baseline condition. Any damage to the buildings resulting from construction activities would be repaired in accordance with the Secretary of the Interior's Standards for Rehabilitation.	Same as N-6	Same as N-6	Same as N-6

Construction Period Hazardous Material Impacts

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Hazardous Wastes and Materials	Construction workers or public may be exposed to contaminated soil, groundwater, lead-based paint and asbestos during grading, excavation, and dismantling of existing bridge. **Mitigation-**Construction and dismantling of all structures would include procedures for the identification, abatement, handling, and disposal of contaminated materials, as well as worker health and safety. All procedures would be consistent with Caltrans' guidelines and all federal, state and local laws and regulations.	Same as N-6	Same as N-6	Same as N-6

Construction Period Impacts to Water Resources and Water Quality				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
Water Quality	Potential impacts from construction activities include but are not limited to: groundwater contamination from excavations; surface water impacts from dredging and dewatering, concrete placement and washout activities, management and application of chemical products; construction activities performed on barges; use of floating batch plants; and accidental spills from construction equipment and materials. **Mitigation-**A Storm Water Pollution Prevention Program (SWPPP) would be prepared to identify pollutant sources that may affect the quality of the discharges of storm water associated with the construction activities of the project and to identify and implement storm water pollution control measures to reduce pollutants in storm water discharges. The objectives of the SWPPP would be to minimize the degradation of off-site receiving waters to the maximum extent practicable with the current Best Management Practices (BMPs) for the construction industry and to reduce the mass loading of chemicals and suspended solids to the downstream drainage system and the receiving water bodies.	Same as N-6	Same as N-6	Same as N-6; however, because the existing structure would not be dismantled, a separate SWPPP for dismantling would not be required.

Temporary Change in the Volume and Area of Other Waters of the U.S. as defined by ACOE

Under the Clean Water Act, the ACOE considers fill in Other Waters of the U.S. to be solid material placed in jurisdictional waters below the Mean High Water Line (MHWL), which is approximately +1.42 meters NGVD (+4.63 feet) at Yerba Buena Island and the Oakland touchdown area. The analysis of fill in Other Waters of the U.S. does not include fill in special aquatic sites. Impacts to special aquatic sites are addressed separately.

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Change in Volume to Other Waters of the U.S.	Would result in a net decrease of 41,000 cubic meters (54,000 cubic yards).	Same as N-6	Would result in a net decrease of 45,000 cubic meters (58,000 cubic yards).	Would result in a net decrease of 13,000 cubic meters (17,000 cubic yards).
Change in Surface Area to Others Waters of the U.S.	Would result in a net decrease of 0.80 hectare (1.97 acre).	Same as N-6	Would result in a net decrease of 1.05 hectare (2.59 acre).	Would result in a net decrease of 0.36 hectare (0.90 acre).

Temporary Change in the Volume and Area of San Francisco Bay as defined by BCDC

Under the McAteer-Petris Act, BCDC considers Bay fill to be any solid, pile-supported, floating, cantilevered or high-level suspended material that is placed bayward of the Mean High Tide Line (MHTL) which is approximately +0.82 meters NGVD (+2.68 feet) at Yerba Buena Island and +0.84 meters NGVD (+2.77 feet) at the Oakland Touchdown area. Unlike the ACOE, the analysis of fill under BCDC's jurisdiction includes fill in special aquatic sites such as wetlands, eelgrass beds and sand flats.

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Change in Volume of the Bay	Would result in a net increase of 48,000 cubic meters (63,000 cubic yards).	Same as N-6	Would result in a net increase of 42,000 cubic meters (54,000 cubic yards).	Would result in a net decrease of 12,000 cubic meters (15,000 cubic yards).
Change in Surface Area of the Bay	Would result in a net decrease of 7.12 hectares (17.6 acres).	Would result in a net decrease of 7.07 hectares (17.48 acres).	Would result in a net decrease of 6.25 hectares (15.44 acres).	Would result in a net decrease of 0.05 hectares and (0.13 acres).

Construction Period Impacts to Special Aquatic Sites

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Sand flats **The sand flats located within the project area occur along the north side of the Oakland Touchdown area and along the southeast side of Yerba Buena Island, east of the U.S. Coast Guard facility. Their functions are foraging and roosting habitat for a variety of shorebirds.**	Placement of a geotube for dewatering would impact approximately 0.69 hectare (1.70 acres) of sand flats along the north shore of the Oakland Touchdown area, resulting in a small reduction in roosting and feeding habitat for shorebirds. **Mitigation-**On-site restoration of portions of sand flats following construction; off-site creation of tidal marsh ecosystem would include enhancement or creation of upland refugia for shorebirds.	Same as N-6	Trestles would temporarily impact 0.01 hectare (0.02 acre) along the south shore of YBI. **Mitigation-**Same as N-6	No impact

Construction Period Impacts to Special Aquatic Sites (continued)

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Eelgrass Beds **Five areas of eelgrass beds have been identified. There are two on the north shore of YBI, two on the south shore of YBI and one on the north shore of the Oakland Touchdown area. Their functions are food source, nursery, spawning ground, and/or habitat for resident and migratory species of birds, fish, and invertebrates.**	Temporary impacts to 0.01 hectare (0.02 acre) of eelgrass at the Oakland Touchdown area from turbidity associated with dredging, pile driving, and barge maneuvering. **Mitigation-**Would include utilization of dredge types and techniques that minimize turbidity and implementation of a turbidity control program; marking eelgrass beds outside access channel as Environmentally Sensitive Areas (ESAs); harvesting eelgrass from within the barge access channel and replanting in adjacent beds as a pilot program; restoring bathymetry of portions of barge access channel and replanting with eelgrass to facilitate eelgrass colonization; off-site creation of tidal marsh ecosystem.	Same as N-6	Same as N-6	No impact
Wetlands **The tidal wetlands in the project study area are located along the north shore of the Oakland Touchdown area and the north side of Yerba Buena Island. These wetlands possess a moderate level of functions and values. The two non-tidal wetlands on the south side of the Oakland Touchdown area possess very limited functions and values due to the lack of wetland species diversity and human disturbance.**	Caltrans would avoid potential construction period impacts to the tidal wetlands at the Oakland Touchdown area and Yerba Buena Island and the two isolated non-tidal wetlands at the Oakland Touchdown area by designating them as Environmentally Sensitive Areas (ESAs).	Same as N-6	Tidal wetlands at YBI would be marked as ESA's. No construction-period impacts to non-tidal wetlands at the Oakland Touchdown. For permanent impacts, see page S-33. **Mitigation-**Off-site creation of non-tidal wetlands.	Same as N-6

Construction Period Impacts to Wildlife

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Peregrine falcon **Removed from Federal Endangered Species List. Protected by State Endangered Species Act and Migratory Bird Treaty Act.** **Mitigation would apply even though the falcon has been delisted.**	Construction activities could impact breeding and nesting. **Mitigation-**The Santa Cruz Predatory Bird Research Group would monitor the birds during their nesting period and if they show signs of disturbance during construction or dismantling operations, the eggs and/or chicks would be collected, raised off-site and eventually released at a natural site such as Point Reyes.	Same as N-6	Same as N-6	Same as N-6
Double-Crested cormorant and the Western Gull **Protected by Migratory Bird Treaty Act.**	If cormorants or gulls nest within construction work areas, nests could be disturbed during construction. **Mitigation-**Caltrans would prevent nesting on the new span during construction.	Same as N-6	Same as N-6	Same as N-6
Black-crowned Night Heron, Allen's hummingbird, white-tailed kite, bank swallow, and Bewick's wren	Vegetation and tree removal on YBI may impact nesting on YBI. **Mitigation-**Prior to the removal of vegetation and trees, a biological monitor would survey for nests. Vegetation and trees with nests or those adjacent to areas with nests would not be removed until the nesting is complete or to the extent feasible, vegetation and trees that need to be removed could be removed prior to the nesting season.	Same as N-6	Same as N-6	Same as N-6
Shorebirds	Construction period impacts to sand flats would cause a reduction in roosting and feeding habitat for shorebirds. In addition, a small portion of upland roosting habitat located on the south side of the Oakland Touchdown area would be temporarily displaced for use as a construction staging area. **Mitigation-**See mitigation for construction period impacts to sand flats.	Same as N-6	Same as N-6	A small portion of upland roosting habitat located on the south side of the Oakland Touchdown area would be temporarily displaced for use as a construction staging area. **Mitigation-**Same as N-6.

Construction Period Impacts to Wildlife (continued)				
Impact Category	**Replacement Alternative N-6**	**Replacement Alternative N-2**	**Replacement Alternative S-4**	**Retrofit Existing Structure Alternative**
California sea lion and harbor seal **California sea lions and harbor seals are protected from harassment under the Federal Marine Mammal Protection Act.**	Noise from pile driving may disturb harbor seals and sea lions when they are foraging in the area. Marine mammals swimming in the project vicinity would be temporarily displaced if they chose to avoid the area. **Mitigation-**Appropriate mitigation would be developed as necessary in coordination with National Marine Fisheries Service (NMFS) such as establishing a safety zone around pile driving activities and sound attenuation during pile driving.	Same as N-6	Same as N-6	Same as N-6
Gray Whale	Noise from the pile driving activity may disturb or impact the behavior of gray whales passing through the project vicinity. It is likely that whales will avoid the pile driving area during the 3-month period in which they are observed in the Bay. **Mitigation-**See mitigation for California sea lion and harbor seal.	Same as N-6	Same as N-6	Same as N-6
Chinook salmon, Steelhead, Green sturgeon, and Longfin smelt **Steelhead are threatened under the Federal Endangered Species Act. Green sturgeon and longfin smelt are state and federal species of concern. Winter-run Chinook salmon are endangered at federal and state level. Spring-run is listed as federally proposed endangered. Fall-run is listed as proposed threatened at the federal level.**	Potential increased turbidity and resuspended contaminants in water column due to dredging, pile driving, barge maneuvering, and trestle and cofferdam construction. Increased amounts of sediment in water could lower dissolved oxygen levels and adversely affect oxygen uptake by fish. **Mitigation-** Implementation of a turbidity control program. If construction sequencing permits, dredging would be avoided in shallow water during the peak juvenile out migration period (January 1 through May 31).	Same as N-6	Same as N-6	Same as N-6

Construction Period Impacts to Wildlife (continued)

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Pacific herring **Pacific herring is a commercially important fish in San Francisco Bay monitored by California Department of Fish and Game.**	Acoustical impacts and turbidity could affect winter spawning. **Mitigation-**A qualified biologist would monitor construction during the spawning period (January to March). If spawning is observed in the project area, in-water activities such as dredging would be suspended within 200 meters (656 feet) of spawning and not resume for a period of up to 14 days. Would include utilization of dredge types and techniques that minimize turbidity, and implementation of a turbidity control program.	Same as N-6	Same as N-6	Same an N-6
Fish (in General)	Pile driving may have impacts on fish within the immediate vicinity. During the PIDP, injury and mortality of small fish (anchovies, herring, and perch) were observed within the immediate vicinity of pile driving operations. **Mitigation-**Noise attenuation measures would be used for any pile driving during the peak juvenile salmon outmigration period that will protect the non-salmonid species as well.	Same as N-6	Same as N-6	Same as N-6

Construction Period Impacts to Cultural Resources

Discussed under permanent impacts to Cultural Resources identified earlier in the table.

Construction Period Excavation and Dredging

The Dredged Material Management Office (DMMO) approved the Sampling and Analysis Plan (SAP) and the Sediment Sampling and Analysis Report (SAR). The purpose of the plan and report was to collect and analyze sediment samples from new pier locations and access dredging necessary for Replacement Alternative N-6. Additional sediment characterization may be required by the DMMO if an alternative other than Replacement Alternative N-6 is selected. For all replacement alternatives, the sediments in the barge access channel for dismantling the existing bridge would need to be characterized in the future. The Dredged Material Management Plan describes reuse/disposal of materials and can be found in Appendix M. The determination of the DMMO concerning reuse/disposal sites is discussed in Section 4.14.10-Construction Excavation and Dredging.

Impact Category	Replacement Alternative N-6	Replacement Alternative N-2	Replacement Alternative S-4	Retrofit Existing Structure Alternative
Estimated Dredged Quantities	Total estimated volume is 413,000 cubic meters (540,000 cubic yards).	Same as N-6	Total estimated volume is 417, 000 cubic meters (545,000 cubic yards).	Total estimated volume is 116,000 cubic meters (152,000 cubic yards).

CHAPTER 1
PURPOSE OF AND NEED FOR PROJECT

1.1 PROJECT PURPOSE

The purpose of the San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project (East Span Project) is to provide a lifeline[1] vehicular connection that:

- Connects Yerba Buena Island (YBI) in San Francisco and the SFOBB Toll Plaza in Oakland;
- Connects to a lifeline route linking the East Bay, San Francisco, and the San Francisco Peninsula;
- Maintains the current vehicular capacity of the existing East Span;
- Provides for safety of bridge users during a maximum credible earthquake[2] (MCE); and

[1] Lifelines are the systems and facilities that provide services vital to the function of an industrialized society and are critical to the emergency response and recovery after a natural disaster. These systems and facilities include hospitals, fire control and policing, food distribution, communication, electric power, liquid fuel, natural gas, transportation (airports, highways, ports, rail, and transit), water, and wastewater.

Facilities that are determined to be lifeline have extraordinary criteria applied to the design that result in a higher level of operation after a natural disaster. For example, the Uniform Building Code (UBC) divides dwellings into five occupancy categories. The UBC's highest level of importance, "essential facilities", are those defined as lifeline such as surgery and emergency treatment facilities, police and fire stations, aviation control towers, and the like. The design factors for seismic forces and wind loads are increased by 25-50% over the same factors that would be used for dwellings of lesser public importance. The higher importance factors for the essential facilities are then applied to calculations for the design that result in a 25-50% more durable structure. The higher durability is needed for the structure to withstand destructive forces and remain partially or wholly functional in the post-disaster condition.

In the case of the East Span, a lifeline connection would provide for post-earthquake relief access linking major population centers, emergency relief routes, emergency supply and staging centers, and intermodal links to major distribution centers. The East Span would be serviceable soon after an MCE. After inspection by Caltrans personnel, emergency vehicles would be able to travel over the bridge at reduced speeds within hours after a major seismic event. In a few days, with minor repairs, the bridge would be open to the general public (at reduced service; i.e., slower travel speeds).

[2] An MCE is the largest earthquake reasonably capable of occurring, based on current geological knowledge. Caltrans has projected the MCE for the SFOBB East Span as an earthquake of magnitude 8 (Richter scale) on the San Andreas fault or 7¼ on the Hayward fault. The design standard reflected in the DEIS was the MCE approach. However, while earthquakes are often described in terms of their magnitude, they can also be described in terms of their return period, which is the approximate time interval expected between two earthquakes of comparable intensity. Designers of major engineering structures design for an earthquake with a long return period of approximately 1,000 to 2,000 years, called a Safety Evaluation Event (SEE). The design standard for the East Span Project was upgraded to the more stringent SEE standard, meaning that a replacement bridge would be able to withstand a larger earthquake than an MCE. Designers for the East Span Project are using an SEE with a 1,500-year return period in their design criteria for a replacement bridge. This SEE is an earthquake that would generate the largest rock motions expected to occur at the bridge site an average of once every 1,500 years, or ten

- Improves operational and safety design to meet current standards to the greatest extent possible.

The SFOBB East Span Project will provide a seismically upgraded vehicular crossing for current and future users. SFOBB East Span Project replacement bridge alternatives will not preclude a bicycle/pedestrian path.

1.2 NEED FOR PROJECT

The existing East Span must be replaced or retrofitted because it is not expected to withstand an MCE on the San Andreas or Hayward faults, it does not meet lifeline criteria for providing emergency relief access following an MCE, and it does not meet current operational and safety design standards.

The project is proposed to address the following major transportation needs and deficiencies identified specifically on the bridge between YBI and the SFOBB Toll Plaza:

- Lifeline Connection - The existing SFOBB East Span does not provide a lifeline connection that is likely to survive or be usable after an MCE;

- People, Freight and Goods Movement - The existing SFOBB East Span is likely not to allow for high levels of people, freight, and goods movement following an MCE; and

- Current Roadway Design Standards - The existing SFOBB East Span does not meet current roadway operational and safety design standards.

Each of these needs is described in the following sections.

times the projected 150-year life span of a replacement bridge. The Seismic Safety Peer Review Panel and the Ad Hoc Committee on Seismic Ground Motions (AHC) of MTC's Engineering and Design Advisory Panel (EDAP) considered it appropriate to design a replacement bridge for these ground motions. Furthermore, the AHC evaluated the differences in the ground motions at the bridge site resulting from an MCE and an SEE. On December 7, 2000, the AHC reported its findings to Joseph Nicoletti, Chairman of the EDAP (see Appendix G). In its letter, the AHC said, "In summary, the AHC concludes that the ground motions defined by the SEE response spectra adopted for the replacement bridge design exceed the San Andreas MCE ground motions defined by standard practice at all periods of engineering relevance." Since a replacement bridge would be built to withstand an SEE, which would generate greater motions than an MCE, it would also withstand an MCE. For further discussion of seismic design, see Appendix K.

For purposes of consistency and readability, the FEIS continues to reference the MCE standard; however, the seismic design of a replacement bridge would meet the higher SEE standard. In any event, the MCE standard is subsumed in the SEE standard.

1.2.1 Lifeline Connection - The existing SFOBB East Span does not provide a lifeline connection that is usable after an MCE.

Improvements to the existing East Span are needed to address seismic safety deficiencies and provide a bridge crossing that is usable soon after a major seismic event. It is likely that the existing SFOBB East Span would develop multi-span failures leading to collapse and loss of life in the event of an MCE, even with the recent completion of the interim retrofit project. The East Span does not provide for public safety during an MCE.

Maximum Credible Earthquake

On the basis of research conducted since the 1989 Loma Prieta earthquake, U.S. Geological Survey (USGS) and other scientists conclude that there is a 70 percent probability of at least one magnitude 6.7 or greater quake, capable of causing widespread damage, striking the San Francisco Bay region before 2030. Major quakes may occur in any part of this rapidly growing region. This emphasizes the urgency for all communities in the Bay region to continue preparing for earthquakes.[3]

The seismic design criteria set for the East Span Project have been established as an 8 magnitude earthquake on the San Andreas fault or a 7-1/4 magnitude earthquake on the Hayward fault. The MCE on each of these faults is defined as the largest earthquake that appears to be reasonably capable of occurring based on current geological knowledge. While these values could be exceeded, the values represent the best estimates at this time. The probability of an MCE occurring on one of these faults is approximately one in four over the next two to three decades.[4]

An MCE on either the San Andreas or Hayward fault would be expected to inflict far greater damage to the SFOBB than was experienced from the 1989 Loma Prieta earthquake, during which one section of the upper deck collapsed, killing one person. This is due to the potential for the epicenter of an event on either the San Andreas or Hayward fault to be nearer the bridge, as well as the expected greater magnitude of the MCE compared to that of the Loma Prieta earthquake (magnitude 7.1). It is estimated that an MCE with an 8 magnitude would generate in excess of 30 times more energy than the Loma Prieta earthquake. The feasibility of reopening the existing East Span to traffic following an MCE would be limited or precluded without the seismic safety improvements proposed in the East Span Project.

Lifeline Structure

The SFOBB provides a critical connection between San Francisco, the East Bay, and the I-80 corridor to the east. Designation by the California Department of Transportation (Caltrans) of the SFOBB corridor as a lifeline system connection represents the State's intention to use the SFOBB to provide a high level of post-

[3] U.S. Geological Survey, Major Quake Likely to Strike Between 2000 and 2030, U.S. Geological Survey Fact Sheet 152-99, 1999.
[4] U.S. Geological Survey, Probabilities of Large Earthquakes in the San Francisco Bay Region, California, U.S. Geological Survey Circular 1053, 1990.

earthquake transportation service for emergency response and support for the safety and economic livelihood of the Bay Area. Combined with the West Span seismic retrofit (now under way), the retrofit of the west YBI viaduct and YBI tunnel, and the West Approach replacement, replacement of the East Span would complete the lifeline connection.

The criteria for state lifeline route designation and their applicability to the SFOBB East Span Project are listed below:

- The route provides emergency relief access through or across a potentially impacted region, connecting major population centers within the region - The SFOBB East Span links San Francisco and the San Francisco Peninsula with Oakland and the East Bay;

- For areas with more than one route providing interregional access, the route provides the most effective emergency relief access - The SFOBB, one of five toll bridges crossing San Francisco Bay, provides the shortest and most direct access between the cities of San Francisco and Oakland. The SFOBB provides a high-capacity (10-lane) direct connection between two major Bay Area communities (San Francisco and Oakland);

- The route provides direct or nearby access to and from major emergency response and recovery supply centers and staging areas - The SFOBB provides the most direct access between the medical centers in San Francisco and Oakland and the ports of San Francisco and Oakland; and

- The route provides access to an airport (military or civilian), seaport, major rail facility, or a major distribution center that would be involved in immediate relief activities - The SFOBB provides access to the Port of San Francisco and the Port of Oakland. It is near the Union Pacific Railroad yards at the Port of Oakland. It is part of the lifeline route that provides vehicular access to and from Travis Air Force Base in Fairfield, which would be a major distribution center providing immediate post-earthquake relief.

Cooperative earthquake response planning among Bay Area transportation providers focuses on the roles of agencies, including Caltrans, in post-earthquake response. Emphasis is placed on actions during the first 72 hours after an earthquake. Response scenarios do not call out procedures to be implemented at specified locations. Overall responsibilities for participating agencies are defined.

Caltrans preparedness planning consists of activities, including cooperation with the California Highway Patrol (CHP), in developing traffic control and evacuation procedures; activating emergency response resource centers; and establishing route recovery plans.[5]

[5] Association of Bay Area Governments, Riding Out Future Quakes (www.abag.ca.gov/bayarea/eqmaps), 1998.

Although no detailed plan for a lifeline SFOBB post-earthquake use is defined, it can be anticipated that the structure would be used to transport heavy equipment, such as cranes and bulldozers, to work sites. The structure would also be used to distribute supplies from the San Francisco and Oakland ports to recovery centers. Automobile and bus transit traffic would likely be banned from the SFOBB so as not to interfere with emergency response, then would be restored on the SFOBB as feasible. As a lifeline vehicular bridge, the SFOBB would have the flexibility to move equipment and goods during post-earthquake recovery that cannot be accommodated by Bay Area Rapid Transit (BART) and ferry service.

1.2.2 People, Freight, and Goods Movement - The existing SFOBB East Span cannot maintain high levels of freight and goods movement following an MCE.

The SFOBB East Span, currently operating at capacity, is used by approximately 272,000[6] vehicles each day, making it a critical transportation link in the Bay Area. The volume of traffic on the SFOBB is approximately double that of the Golden Gate Bridge and almost equal to the combined traffic carried by the four other Bay Area bridges. For motor vehicle traffic, the Golden Gate Bridge and other Bay Area bridges are essentially non-redundant systems, with alternative routes to the other bridges being time consuming to a level that seriously impacts commercial and institutional productivity. Providing a seismically safe, lifeline vehicular bridge crossing is critical to retaining the ability to move high volumes of people between San Francisco, the San Francisco Peninsula, and the East Bay.

The SFOBB is a primary route for movement of freight and goods between the San Francisco Peninsula and the East Bay. It provides access for San Francisco to the intrastate and interstate trucking network in the East Bay and beyond. The SFOBB provides a link for seaport cargo and air freight delivery between the ports and airports in both San Francisco and Oakland. The bridge is also a link for local delivery of freight and goods. The SFOBB carries the greatest amount of total traffic and truck traffic of all the Bay Area toll bridges (see Table 1.2-1). Maintaining the capacity of the East Span to accommodate large volumes of truck traffic is important for distribution of freight and goods to facilitate economic recovery following an MCE. Disruption of this critical link in the transportation system by damage or failure due to an earthquake would require rerouting approximately 8,000 truck trips per day to other toll bridges, assuming these other bridges are not similarly damaged. Extended interruption of the capacity of the East Span to accommodate large numbers of trucks would have an adverse effect on the local and regional economy.

[6] 1998 Traffic Volumes on the California State Highway System, State of California Business, Transportation and Housing Agency, Department of Transportation. Prepared in cooperation with the U.S. Department of Transportation Federal Highway Administration, April 2000.

Table 1.2-1 Annual Average Daily Total (AADT) Traffic and Truck Traffic on Bay Area Toll Bridges

Bridge	Total AADT	Truck AADT	Percent Trucks	Percent Large Trucks[a]
SFOBB	272,000	8,430	3.1	39
Dumbarton	65,000	2,470	3.8	34
San Mateo-Hayward	85,000	5,525	6.5	42
Golden Gate	116,000	2,286	2.0	16
Richmond-San Rafael[b]	60,000	4,180	7.0	43
Carquinez	109,000	7,740	7.1	64
Benicia-Martinez	98,000	7,546	7.7	50

Source: 1998 Traffic Volumes on the California State Highway System, Caltrans, April 2000.
[a]Percentage of 4- and 5-axle trucks of total trucks.
[b]Measurement location at junction of I-580/Route 101, Marin County.

1.2.3 Current Roadway Design Standards - The existing SFOBB East Span does not meet current roadway design standards for operations and safety.

Design standards are applied to bridge and roadway projects to provide a safe facility. The SFOBB East Span, constructed in the 1930s, does not meet all of the current mandatory and advisory design standards, including:

- Typical Section - The existing East Span has non-standard lane widths. Existing lanes are 3.5 meters (11.7 feet) wide compared to the 3.6-meter (12-foot) standard. The current standard is for a lane width that can accommodate large trucks and separate vehicles traveling at higher speeds. This is a higher standard than what was in place when the bridge was constructed;

- Roadway Shoulders - The existing East Span does not have roadway shoulders. Standard shoulder widths are 3 meters (10 feet) on either side of the roadway. Provision of shoulders on the SFOBB East Span would provide space for stalled vehicles to be moved out of travel lanes. Lack of shoulders contributes to the high level of congestion caused by even minor incidents on the existing East Span;

- Horizontal Alignment - The existing East Span lower deck approaching the east shore has a non-standard straight roadway length between two curves: 18.3 meters (60 feet) compared to the current 177-meter (581-foot) standard. Provision of a straight section of roadway between curves allows drivers to anticipate upcoming changes in roadway alignment and maintain vehicle control;

- Vertical Alignment - Where the existing East Span upper deck roadway meets the existing YBI tunnel entrance, the bridge connection has a vertical alignment that should not occur on a typical roadway. This vertical alignment reduces the amount of roadway a driver can see entering or leaving the tunnel and reduces the amount of time a driver has to respond to conditions in front of the vehicle. The existing

vertical curve approaching the YBI tunnel is 46 meters (150 feet). The current standard is 160 meters (525 feet);

- Superelevation - Curving roadways are designed to bank (elevation of one side of the roadway is higher) to promote safe turning of vehicles and provide driver comfort against outward centrifugal force. The existing East Span curve east of the tunnel portal has a non-standard superelevation rate of five percent compared to the standard eight percent;

- Clearances - The minimum vertical clearance on the existing East Span east of the tunnel is 4.9 meters (16 feet) compared to the 5.1-meter (17-foot) standard. Height standards above roadways have increased to accommodate larger vehicles and the need to transport specialized cargo on interstate highways. Horizontally, there is no space between the travel lanes and the bridge rail on the East Span. Standard minimum horizontal clearance is 1.2 meters (4 feet); and

- Stopping Sight Distance - The existing East Span has inadequate stopping sight distance around the curve on the existing bridge 520 meters (1,706 feet) east of the tunnel portal. According to current standards, the stopping sight distance for the inside lane would accommodate only a speed of 40 kilometers per hour (25 miles per hour).

1.3 BACKGROUND

1.3.1 The San Francisco-Oakland Bay Bridge

The SFOBB is historically important in the Bay Area and worldwide. Construction of this structure began in 1933 and was completed and opened to traffic in 1936. At the time of its construction, the bridge was the world's longest vehicular bridge, and the YBI tunnel, a double-decked structure, was the largest bore tunnel of its time at 23 meters (76 feet) long by 15 meters (50 feet) wide by 15 meters (50 feet) high (see Figure 1-1 in Appendix A).

The SFOBB currently serves 272,000 vehicles each day. The SFOBB provides regional access between the San Francisco Peninsula and the East Bay. As a component of Interstate 80 (I-80), it is a critical link in the interstate highway network. The Dwight D. Eisenhower System of Interstate and Defense Highways, established in 1954 during Eisenhower's presidency, is a network of access-controlled and grade-separated highways designed to serve the national defense and to connect states and routes of continental importance in Canada and Mexico.[7]

The SFOBB is a double-deck structure carrying five traffic lanes on each level. The West Span connects San Francisco to YBI. A concrete viaduct and approach ramps eastward from Fifth Street in San Francisco at the west end, 1,130 meters (3,707 feet) long, connect to the two suspension spans, each over 1,400 meters (4,593 feet) long.

[7] Federal-Aid Highway Act of 1954.

On the island, there are two concrete viaducts, 165 meters (541 feet) and 65 meters (213 feet) in length, at either end of the 164.4-meter (539-foot) long double-deck tunnel.

The East Span is the portion of the structure between YBI and Oakland. An 800-meter (2,625-foot) long viaduct extends from the YBI tunnel east portal eastward across the island. A series of steel truss spans carries the highway across the eastern portion of the Bay. The steel spans include a 737-meter (2,418-foot) cantilever truss adjacent to the island, followed by five high truss spans 155.1 meters (509 feet) each, and 14 shorter spans, which bring the roadways to the East Bay shoreline.

1.3.2 Overview of the Seismic Retrofit Program

Caltrans' design program to seismically retrofit State-owned, city, and county bridges has been highly influenced by recent earthquakes in California. In particular, the 1971 San Fernando earthquake, the 1987 Whittier Narrows earthquake, the 1989 Loma Prieta earthquake, and the 1994 Northridge earthquake greatly influenced the direction, design, scientific research, and priorities of Caltrans' seismic retrofit program. These earthquakes prompted new research and funding for the seismic retrofit of transportation structures, which has included pioneering research and design focusing on the seismic behavior of large bridges. This has led to increased understanding of how bridges behave in earthquakes, new techniques for retrofitting existing bridges, and improved design criteria for new construction. Over the past three decades, this work has placed Caltrans at the forefront of the evolving field of seismic retrofit design. For further information on how the program relates to the East Span Project, refer to Appendix K.

1.3.3 Effects of the Loma Prieta Earthquake and a Maximum Credible Earthquake

On October 17, 1989, the Loma Prieta earthquake struck the San Francisco Bay Area. Its epicenter was in a sparsely populated area of the Santa Cruz Mountains, 97 kilometers (60 miles) away from the SFOBB. The California Office of Emergency Services (OES) reports that the earthquake caused 62 deaths and $5.6 billion in property damage, and 8,000 people were left homeless. Over 1,300 buildings were destroyed and 20,000 buildings were damaged.[8] On the SFOBB, the earthquake caused a portion of the upper deck of the East Span to collapse onto the lower deck, resulting in one death. The East Span was closed for four weeks while the damage was repaired. Caltrans estimated that the increased delay experienced by commuters rerouted to other Bay crossings, including other modes such as ferries or BART, cost as much as $12 million.

The Association of Bay Area Governments (ABAG) conducted an assessment of the regional macroeconomic impacts of the Loma Prieta earthquake. ABAG concluded that the maximum loss to the Gross Regional Product was in the range of $181 to $725 million. ABAG noted that San Francisco suffered a significant loss ($73 million) in

[8] California Office of Emergency Services, Loma Prieta Earthquake: Homes/Businesses Damaged/ Destroyed, December, 1989.

taxable sales activity, and that "a major portion of the loss in economic activity in San Francisco may have been due to a loss in transportation access."[9]

The Loma Prieta earthquake showed the vulnerability of the transportation system to a relatively distant earthquake. Future planning must recognize the likelihood and potential consequences of closer and more powerful events on the San Andreas and Hayward faults. An MCE on the San Andreas fault could generate over 30 times more energy than the Loma Prieta earthquake. An MCE on the Hayward fault could generate about the same energy as the Loma Prieta earthquake. Damage from an MCE on either of these faults could be heavier and much more widespread compared to damage from the Loma Prieta earthquake, including the collapse of thousands of buildings, extensive infrastructure damage, and major loss of life. The magnitude of such a natural disaster would necessitate the kind of emergency access provided by the bridge retrofitted to lifeline standards. On the existing SFOBB East Span, an MCE could cause catastrophic bridge failure, potentially resulting in numerous immediate casualties and requiring many months to reopen the bridge or years to build a replacement. Immediate emergency response and more long-term economic recovery would be delayed.

1.3.4 Analysis of Potential Retrofit of SFOBB East Span

Caltrans began action following the Loma Prieta earthquake to design seismic safety improvements for the SFOBB East Span. Seismic safety strategies initially investigated focused on retrofit of the existing East Span structure. A retrofit alternative was devised and initial environmental review conducted. Consultation with permitting and regulatory agencies was initiated.

An important consideration for the retrofit of bridges maintained by Caltrans is the cost of upgrading the existing structures to current seismic criteria measured against the remaining useful life of the bridges. Caltrans has developed a cost/benefit formula to assist in determining the need to retrofit a bridge compared to replacing it. First it must be determined that there is a viable retrofit alternative (i.e., the existing structure can be retrofitted to meet seismic safety criteria established for the structure). This decision is made by Caltrans with input from a Seismic Advisory Board, an industry and academic advisory panel which was established following the Loma Prieta earthquake to provide Caltrans assistance in determining effective seismic safety technologies.

The Caltrans formula takes into account both construction costs and life-cycle costs.[10] Cost comparisons of retrofit and replacement alternatives indicated that seismic retrofit of the existing span could be accomplished at a lower cost than the cost to replace the structure. However, replacement bridge alternatives would have lower life-cycle

[9] "Macroeconomic Effects of the Loma Prieta Earthquake," ABAG, 1991.

[10] California Department of Transportation, Transportation Economics Planning Program, Retrofit vs. New Bridge, An Economic Analysis for the East Span of the San Francisco-Oakland Bay Bridge, April 1997.

costs[11]; therefore, consideration of bridge replacement was recommended to Governor Pete Wilson by the Business, Transportation and Housing Agency.

1.3.5 Analysis of Potential Replacement of the SFOBB East Span

In February 1997, Governor Pete Wilson adopted the recommendations of the Business, Transportation and Housing Agency that replacement of the SFOBB East Span be considered. The Metropolitan Transportation Commission (MTC) organized the San Francisco-Oakland Bay Bridge Design Task Force (Task Force) to consider replacement bridge alternatives. Alternatives under consideration in this environmental document include replacement options defined through the Task Force proceedings. The Task Force mandate was to develop a consensus recommendation on a design option for a new eastern span of the SFOBB and to recommend any additional features that might be included in the design of the bridge that would not be borne by funding allocated from the State of California. A description of the MTC process is provided in the Preface and Appendix E — Consultation and Coordination of this Final EIS.

1.3.6 Other SFOBB Seismic Safety Projects

Caltrans is undertaking a number of independent actions to address the overall need of providing a lifeline bridge connection between the cities of San Francisco and Oakland. Design of one project does not determine or preclude design of the other projects. In combination, these actions will provide for a lifeline structure connecting San Francisco and the San Francisco Peninsula to the East Bay. The individual projects, in addition to contributing to the seismic safety improvement of the SFOBB, have been defined to contribute independently to seismic safety of bridge users in the event of an MCE and the associated economic benefits of keeping the bridge usable after an MCE. As each of the projects is completed, bridge users will benefit from seismic safety improvements and specific lifeline access issues will be resolved.

In addition to the East Span Project, Caltrans is undertaking other actions to seismically retrofit the SFOBB. The limits of these projects are shown in Figure 1-1 in Appendix A and consist of:

- West Approach Seismic Replacement - The West Approach extends from Fifth Street to the West Anchorage in San Francisco. The retrofit of this portion of the bridge calls for complete replacement of most of the structure. Completion of the West Approach Seismic Replacement Project will provide for lifeline access into San Francisco and the Transbay Transit Terminal area in the event of an MCE;

- West Span Seismic Retrofit - The West Span is the portion of the structure from the West Anchorage to YBI. Retrofit of the West Span will add bracing beneath the upper deck, add plates on the towers, and replace the existing lattice work members on the truss portions with solid or perforated plates. Strengthening the

[11] Memorandum to then-Governor Pete Wilson from Dean R. Dunphy, then-Secretary, Business, Transportation and Housing Agency, January 10, 1997, re "Consideration of Replacement of the Eastern Spans of the San Francisco-Oakland Bay Bridge to Provide Seismic Safety."

columns has been partially completed. Upon completion of the West Span Seismic Retrofit Project, lifeline access will be provided between San Francisco and YBI and ensure that bridge damage during an MCE will not affect navigation in the ship channel underneath the structure. In addition, the bridge will be open to emergency vehicles immediately following the event provided access roadways are in operation;

- West Viaduct, YBI - The West Viaduct is the portion of the bridge on YBI immediately west of the YBI tunnel. Retrofit of the West Viaduct was completed in January 2000. The project strengthened the existing double-deck structure by retrofitting or replacing columns and footings and replacing the bent caps underneath the upper deck on-ramp;

- Yerba Buena Island Tunnel - The seismic retrofit project for the tunnel is currently under way. Rock bolts will tie back the portals, arched headwalls, selected retaining walls, architectural walls, and one rock slope north of the west portal. Seismic safety improvements to the tunnel will ensure that the high traffic volumes using SFOBB can be maintained in an MCE and that detours on the island will not be required to move through-traffic; and

- East Span Interim Seismic Retrofit – In summer 2000, work was completed to implement an interim seismic retrofit of the existing East Span to withstand a likely earthquake (estimated to be an earthquake that induces less than 0.25g on the existing structure), but not an MCE. The Interim Retrofit Project consisted of strengthening bents and columns on the East Viaduct (on YBI) and strengthening columns, bents, and trusses at selected locations on the East Span structure. The interim project provides for increased seismic safety on the existing structure until an East Span retrofit/replacement alternative is implemented.

1.3.7 Legislative Framework

The California Legislature has in various legislative findings and declarations expressed its intent to complete the seismic retrofit of State-owned and State-operated highways. Following the 1971 San Fernando Valley earthquake, seismic design standards for transportation facilities were reassessed in light of the unanticipated damage to certain roadway structures, and a retrofit program was begun. The extensive roadway damage caused by the 1989 Loma Prieta earthquake in northern California and the 1994 Northridge earthquake in southern California prompted an acceleration of the retrofit program, including several efforts to increase program funding. In 1991, the legislature authorized financing seismic retrofit projects from motor vehicle fuel tax revenues and additional funding mechanisms, declaring that "it is in the best interests of the people of California to immediately finance retrofit projects to make state highways safe during seismic events, and to offset any possible delays caused by these projects on approved state highway projects contained in the state transportation improvement program for 1990..." (Government Code, Chapter 5, Article 1, Amended: Statutes of 1991, Chapter 195).

In 1995, recognizing the increasing financial drain of the ongoing seismic retrofit program on limited funding resources, the legislature placed the Seismic Retrofit Bond Act of 1996, or Proposition 192, on the March 1996 ballot, declaring that "the completion of seismic safety retrofit work is essential to the welfare and economy of the state" (Government Code, Title 2, Division 1, Chapter 12.48, Article 1). This act, approved by the voters in 1996, authorized the sale of over $2 billion in state revenue bonds for financing retrofit improvements and temporarily suspended state statutes that were deemed to potentially delay or unnecessarily encumber their implementation. The seismic retrofit and rehabilitation of the SFOBB East Span is a priority project under the state's accelerated retrofit program.

Senate Bills 60 and 226 were passed by the State Legislature and signed into law by the Governor on August 20, 1997. Together, these bills provide a financing mechanism and identify funding sources for seismic improvements for Bay Area toll bridges, including the SFOBB East Span. Senate Bill 60 establishes a one dollar toll surcharge on the seven Bay Area State-owned bridges and identifies additional funds available for seismic upgrades. State fuel tax revenues earmarked for seismic upgrade projects will fund approximately 33.4 percent of the project costs. State Seismic Retrofit Revenue Bonds issued by the State after voter approval of Proposition 192 in March 1996 will fund an additional 30.2 percent. The one dollar toll surcharge on Bay Area toll bridges for eight years will fund the remaining 36.5 percent.

Senate Bill 226 transferred programming authority for Bay Area toll bridges from the California Transportation Commission to the Metropolitan Transportation Commission. As a result, the Bay Area Toll Authority (BATA) is permitted to extend the period of toll surcharges to cover the cost of amenities. These include a cable-supported or other bridge design, improvements to the Transbay Transit Terminal (including possible relocation and/or ramp reconfiguration), and the addition of bicycle/pedestrian access on the SFOBB. Assembly Bill 2038, which amended Senate Bill 60 in June 1998, allows BATA to fund the addition of bicycle/pedestrian access to either the new East Span or the retrofitted West Span or both, within the restrictions set forth by Senate Bill 60 or a future toll surcharge extension.

Seismic retrofit projects, including the East Span Project, are exempt from the requirements of the California Environmental Quality Act (CEQA) under California Streets and Highways Code Section 180.2 and CEQA Section 21080 (see Chapter 5). Although CEQA review has not been conducted for the project, detailed environmental and socioeconomic review is being undertaken to comply with the National Environmental Policy Act (NEPA) and other applicable state and federal laws. The East Span Project will also be subject to the permitting requirements of federal and state regulatory agencies. Consultation is under way with public agencies, including U.S. Coast Guard, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Advisory Council on Historic Preservation, National Marine Fisheries Service, San Francisco Bay Conservation and Development Commission, California Department of Fish and Game, State Historic Preservation Officer, State Lands Commission, and San Francisco Bay Regional Water Quality Control Board.

1.3.8 Concurrence in the Purpose and Need Statement

The project Purpose and Need Statement presented in this chapter was drafted following FHWA Technical Advisory T 6640.8, "Guidance Material for the Preparation of Environmental Documents." The advisory explains that the goals of the Purpose and Need Statement is to "Identify and describe the transportation problem(s) which the proposed action is designed to address." The format and topics described in the advisory were followed in the development of this Purpose and Need chapter.

Determination of the Purpose and Need was more fully developed with public input received at MTC Bay Bridge Design Task Force and Engineering Design Advisory Panel meetings on April 16, 22, 23, and May 8, 1997, which served as project scoping meetings.

The Purpose and Need Statement presented in this Chapter was refined through a collaborative process among federal agencies as outlined in the NEPA/404 Integration Memorandum of Understanding (MOU) (see Appendix F). The MOU sets out a consultation process among designated federal agencies resulting in written concurrence in the project Purpose and Need Statement. Signatories to the East Span Seismic Safety Project Purpose and Need Statement are FHWA, U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, National Marine Fisheries Service, U.S. Environmental Protection Agency, and the Federal Transit Administration.

Non-signatory agencies participating in the development of the Purpose and Need Statement were the San Francisco Bay Regional Water Quality Control Board, the San Francisco Bay Conservation and Development Commission, U.S. Coast Guard, and the California Department of Fish and Game.

A summary of the consultation process resulting in obtaining concurrence in the Purpose and Need Statement is presented in Appendix F.

CHAPTER 2
PROJECT ALTERNATIVES

This chapter describes the alternatives that were analyzed in the Draft Environmental Impact Statement (DEIS), project alternatives that were initially considered but withdrawn from consideration prior to preparation of the DEIS, the reasons for their withdrawal, and identification of the Preferred Alternative.

The Metropolitan Transportation Commission (MTC) is the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area. It functions both as the region's transportation planning agency (RTPA) and as the region's metropolitan planning organization (MPO)—state and federal designations, respectively. The Regional Transportation Plan (RTP), which MTC prepares, is a comprehensive guide for the development of mass transit, highway, airport, seaport, railroad, bicycle, and pedestrian facilities within the Bay Area. The MTC also allocates state and federal funds for transportation projects based on compatibility with this plan.

The MTC-recommended alternative included in this FEIS is Replacement Alternative N-6, self-anchored suspension design variation with a bicycle/pedestrian path. The California Department of Transportation (Caltrans) and Federal Highway Administration (FHWA) identified Replacement Alternative N-6 as the Preferred Alternative. The Preferred Alternative has been identified as the Least Environmentally Damaging Practicable Alternative (LEDPA) in consultation with the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (ACOE). See Section 2.2.6 – Preferred and Least Environmentally Damaging Practicable Alternative for more details.

Pursuant to the National Environmental Policy Act (NEPA), the EIS identifies environmental impacts and values of all reasonable alternatives in sufficient detail to enable decision-makers to evaluate their comparative merits. The East Span Project is a seismic safety project and does not change bridge capacity. As such, a Major Investment Study (MIS) for the SFOBB corridor was not prepared. Identification of the Preferred Alternative occurred following circulation of the DEIS for a 60-day public review period and consideration of all public comments received. Responses to all substantive comments have been prepared and can be found in Volume II, Section I – DEIS Comments and Responses.

The No-Build Alternative does not satisfy the project purpose and need. It is presented and evaluated as a basis of comparison with the reasonable alternatives. As noted in Chapter 1, Caltrans added selected minimal seismic strengthening and stiffening elements to the existing East Span structure as an interim measure. That project, completed in summer 2000, received environmental approval pursuant to NEPA and is not evaluated as an alternative in this Final EIS. The No-Build Alternative assumes completion of this interim work.

2.1 INTRODUCTION

2.1.1 Development of Alternatives

Caltrans has performed preliminary engineering and impact analysis on a range of possible project alternatives in the EIS. The retrofit and replacement alternatives, along with the No-Build Alternative, are described in Section 2.2. Replacement bridge design variations considered in the DEIS are described in Section 2.3, including design variations incorporated into the Preferred Alternative. Section 2.4 provides a comparison of the alternatives, including costs, constructibility, and potential to meet the purpose and need. Section 2.5 discusses multi-modal options for alternatives, and Section 2.6 describes construction scenarios for each of the build alternatives. Section 2.7 describes the alternatives, design variations, and detour options that were considered and subsequently withdrawn from further consideration and the reasons for their withdrawal.

The range of alternatives considered in the EIS was established by Caltrans and FHWA in accordance with NEPA requirements and in consultation with permitting and regulatory agencies under guidance of the NEPA/404 Integration Memorandum of Understanding (NEPA/404 MOU). The NEPA/404 integration process is implemented when a project has the potential to affect waters of the U.S. under the jurisdictional authority of the U.S. Army Corps of Engineers (ACOE), and it is anticipated that an individual Section 404 permit will be required. Participants considered options and provided written concurrence on the range of alternatives and the criteria established for selection of alternatives. The following criteria were agreed upon by the NEPA/404 signatories:

- Meets Caltrans criteria for designation as a lifeline route;
- Meets current standards for operations and safety to the greatest extent possible;
- Maintains the existing number of traffic lanes during peak hours and after construction;
- Does not preclude a bicycle/pedestrian path;
- Does not preclude future improvements to YBI access ramps;
- Minimizes impacts to environmental resources;
- Provides a high level of visual quality; and
- Is a cost-effective solution.

Consistent with the NEPA/404 MOU, NEPA/404 integration process signatories (ACOE and EPA) also concurred on the identification of the Least Environmentally Damaging Practicable Alternative (LEDPA). (See Appendix F for the concurrence letters from the NEPA/404 signatories.)

2.1.2 Project Limits/Location

The SFOBB crosses San Francisco Bay in an east-west direction in the central portion of the San Francisco Bay Area and provides a travel route between San Francisco and Alameda counties (see Figure 2-1 in Appendix A). The bridge touches down near Pier 26 in San Francisco and in northwest Oakland between the East Bay Municipal Utility

District (EBMUD) wastewater treatment facility and the Emeryville Crescent. The West and East Spans of the bridge are connected on YBI by viaduct sections on either side of the YBI tunnel. A main navigation opening channel is located between Columns E2 and E3 of the SFOBB East Span. The channel, shown on Figure 2-2 (Appendix A), is 405 meters (1,328 feet) wide, with vertical clearance of 60 meters (197 feet) above Mean Sea Level (MSL).

The East Span Project will retrofit and/or replace the portion of the SFOBB between the eastern portal of the YBI tunnel and the SFOBB Toll Plaza in Oakland. The western project limit is the eastern portal of the YBI tunnel; however, project-related traffic controls may extend to the western portal of the YBI tunnel and project signage may extend to the west approach in San Francisco. The eastern project limit is located approximately 400 meters (1,312 feet) west of the toll plaza on a spit of land referred to as the Oakland Touchdown area. The project area limits are shown on Figure 2-2 (Appendix A). The project area is defined as the area within the project limits in which temporary and permanent structures would be placed by any of the alternatives and defines the area within which construction activities, including temporary detours, would be expected to occur. The project area widens over water to allow for marine construction activities. In addition, Bay waters on the north side of YBI are included within the project area to allow staging for the delivery of bulk materials and construction equipment by barge or vessel to staging areas on YBI.

2.2 ALTERNATIVES CONSIDERED

Five alternatives, No-Build, Retrofit Existing Structure, Replacement Alternatives N-2, N-6, and S-4, were considered for the East Span Project. Replacement Alternatives N-2 and N-6 are aligned to the north of the existing bridge and Replacement Alternative S-4 aligns south of the existing bridge (see Figure 2-3 in Appendix A). Alignment drawings for the build alternatives are presented in Appendix A (see Figure Series 2-4, 2-7, 2-10, and 2-11). In order to reroute traffic around the construction area while portions of the existing East Span are dismantled and a new transition structure is completed where the existing bridge now stands on YBI, temporary detours would be required on YBI for the three replacement alternatives (N-2, N-6, and S-4).

Caltrans completed a separate Pile Installation Demonstration Project (PIDP) in December 2000 to provide empirical data to contractors and resource agencies about pile driving in the Central Bay. Three test piles were installed as part of the PIDP. The three installed piles would not be used as structural components of any build alternative, though they would be left in place during construction of the East Span Project and could be used for barge mooring. Prior to completion of the East Span Project, all build alternatives would include removal of these three test piles to an elevation of at least 0.46 meter (1.5 feet) below the mudline, to be measured at the time of removal.

In order to connect the new bridge with the existing retrofitted viaduct on YBI and the SFOBB Toll Plaza at the Oakland Touchdown area, all three replacement alternatives would require dismantling the existing East Span structure. Dismantling would also be

required by USCG regulations. A description of the dismantling process is provided in Section 2.6.3.

2.2.1 No-Build Alternative

The No-Build Alternative would retain the existing SFOBB East Span and only assumes the seismic improvements that were completed under the Interim Retrofit Project. The Interim Retrofit Project strengthened bents and columns on the viaduct section on YBI and strengthened or stiffened columns, bents, and trusses at selected locations on the structure, so that the existing East Span would be able to withstand a smaller and more probable earthquake. This work was completed during summer 2000. The No-Build Alternative is evaluated primarily as a basis for comparison with the build alternatives.

2.2.2 Replacement Alternative N-6 (Preferred Alternative)

Replacement Alternative N-6 would construct a 3,514-meter long (11,526-foot long) new bridge north of the existing East Span and dismantle the existing structure. (See Figures 2-10.1a through 2-10.5b in Appendix A).

The western limit of construction for Replacement Alternative N-6 is the eastern portal of the YBI tunnel; however, the limits of work may extend to the western approach of the West Span in San Francisco due to project-related traffic controls and signage. Part of the existing YBI East Viaduct would be retrofitted, modified, partially demolished, and reconstructed. At Bent 48 (see Figures 2-10.1a through 2-10.1c in Appendix A), the new bridge begins with transition structures separating the double-decked lanes into two parallel structures. Outrigger supports would be used to support the upper deck as the lower deck transitions to a structure parallel with the upper deck. The parallel structures curve, enter a tangent or straight section over the existing main navigation opening, curve, then align on tangent toward the Oakland Touchdown area. The parallel structures reach the Oakland shore along the northern edge of the existing Oakland Touchdown area and conform to the existing traffic lanes west of the SFOBB Toll Plaza.

Replacement Alternative N-6 consists of two parallel structures supported by 25 piers over water and 19 bents, set on YBI, and the Oakland Touchdown area. The structures would each be 25.07 meters (82 feet) wide and typically separated by 15 meters (50 feet). The typical roadway section for each bridge deck consists of five lanes, each 3.6 meters (12 feet) wide, left and right shoulders, each 3 meters (10 feet) wide, and traffic barriers (see Figure 2-8 in Appendix A). A 4.7-meter (15.5-foot) bicycle/pedestrian path would be located on the south side of the eastbound deck, 0.3 meter (1 foot) above the roadway elevation and includes viewing areas or belvederes. The five belvederes on the skyway would be 12 meters (39 feet) long by 1.2 meters (4 feet) deep. Caltrans is still investigating whether to include one or two belvederes on the main span that would be 20 meters (66 feet) long by 1.2 meters (4 feet) deep. A simulation of a belvedere design is shown on Figure 2-24 in Appendix A.

The height of the bridge, including the transition structure and the parallel structures, would vary in elevation from 50-55 meters (164-180 feet) above Mean Sea Level (MSL)

at the YBI East Viaduct to 5 meters (16 feet) above MSL at the Oakland Touchdown. A typical profile for replacement alternatives is presented in Figure 2-9 in Appendix A.

2.2.3 Replacement Alternative N-2

Replacement Alternative N-2 would construct a new 3,479-meter long (11,411-foot long) new bridge north of the existing East Span and dismantle the existing structure. (See Figures 2-7.1a through 2-7.5 in Appendix A). The alignment parallels the existing bridge and maintains minimal clearance between the old and new structures to accommodate construction of the new bridge and dismantling of the existing structure.

The western limit of construction for Replacement Alternative N-2 is the eastern portal of the YBI tunnel; however, the limits of work may extend to the western approach of the West Span in San Francisco due to project-related traffic controls and signage. The existing YBI East Viaduct would be retrofitted, modified, partially demolished, and reconstructed. At Bent 48 (sees Figure 2-7.1a and 2-7.1b in Appendix A), the new bridge would begin with new transition structures separating the double-decked lanes to two parallel structures. Outrigger supports would be used to support the upper deck as the new lower deck transitions to a structure parallel with the new upper deck. The parallel structures would curve, enter a tangent (or straight section) over the existing main navigation opening, curve, and align on tangent toward the Oakland Touchdown area. The parallel structures would reach the Oakland shore along the northern edge of the existing Oakland Touchdown area and conform to the existing traffic lanes to the west of the SFOBB Toll Plaza.

Replacement Alternative N-2 would consist of two parallel structures supported by 22 piers over water and 19 bents set on YBI and the Oakland Touchdown area. The structures would each be 25 meters (82 feet) wide and separated by 15 meters (50 feet). The typical roadway section for each bridge deck would consist of five lanes, each 3.6 meters (12 feet) wide, left and right shoulders, each 3 meters (10 feet) wide, and traffic barriers. A 4.7-meter (15.5-foot) bicycle/pedestrian path would be located on the south side of the eastbound deck, 0.3 meter (1 foot) above the roadway elevation and includes viewing areas or belvederes. The five belvederes on the skyway would be 12 meters (39 feet) long by 1.2 meters (4 feet) deep. Caltrans is still investigating whether to include one or two belvederes on the main span that would be 20 meters (66 feet) long by 1.2 meters (4 feet) deep. A simulation of a belvedere design is shown on Figure 2-24 in Appendix A.

The height of the bridge, including the transition structure and the parallel structures, would vary in elevation from 50 to 55 meters (164 to 180 feet) above MSL at the East Viaduct on YBI to 5 meters (16 feet) above MSL at the Oakland Touchdown. A typical profile for replacement alternatives is presented in Figure 2-9 in Appendix A.

2.2.4 Replacement Alternative S-4

Replacement Alternative S-4 would construct a 3,550-meter (11,644-foot) long bridge south of the existing East Span and dismantle the existing structure. (See Figures 2-11.1a through 2-11.5 in Appendix A.) Replacement Alternative S-4 was developed to

minimize bridge length, avoid use of flat land to the north of the existing East Span on YBI and avoid an in-Bay crossing with the EBMUD sewer outfall located to the south of the existing East Span (see Figure 2-3 in Appendix A).

The western limit of construction for Replacement Alternative S-4 is the eastern portal of the YBI tunnel; however, the limits of work may extend to the western approach of the West Span in San Francisco due to project-related traffic controls and signage. The existing YBI East Viaduct would be retrofitted, modified, partially demolished, and reconstructed. At Bent 48 (see Figures 2-11.1a and 2-11.1b in Appendix A), the new structure would begin with new transition structures separating the double-decked lanes to two parallel structures. Outrigger supports would be used to support the upper deck as the lower deck transitions to a structure parallel with the upper deck. The parallel structures would curve, enter a tangent or straight section over the existing main navigation opening, curve gradually, and align toward the Oakland Touchdown area. The parallel structures would reach the Oakland shore to the south of the existing East Span and transition to the existing roadway west of the SFOBB Toll Plaza.

Replacement Alternative S-4 would consist of two parallel structures supported by 23 piers over water and 19 bents set on YBI, and the Oakland Touchdown area. The structures would each be 25.07 meters (82 feet) wide and separated by 15 meters (50 feet). The typical section for each bridge deck would consist of five lanes, each 3.6 meters (12 feet) wide, left and right shoulders, each 3 meters (10 feet) wide and traffic barriers. A 4.7-meter (15.5-foot) bicycle/pedestrian path would be located on the south side of the eastbound deck, 0.3 meter (1 foot) above the roadway elevation and includes viewing areas or belvederes. The five belvederes on the skyway would be 12 meters (39 feet) long by 1.2 meters (4 feet) deep. Caltrans is still investigating whether to include one or two belvederes on the main span that would be 20 meters (66 feet) long by 1.2 meters (4 feet) deep. A simulation of a belvedere design is shown on Figure 2-24 in Appendix A.

The height of the bridge, including the transition structure and the parallel structures, would vary in elevation from 50-55 meters (164-180 feet) above MSL at the East Viaduct to 5 meters (16 feet) above MSL at the Oakland Touchdown. A typical profile for the replacement alternatives is presented in Figure 2-9 in Appendix A.

2.2.5 Retrofit Existing Structure Alternative

Interim seismic retrofit work on the existing East Span was completed at the Oakland Touchdown area in 1998 and in the summer of 2000 on the truss spans and cantilever main span sections, but these are not components of the Retrofit Existing Structure Alternative. This alternative would retrofit the existing SFOBB East Span to withstand a maximum credible earthquake (MCE) on the San Andreas or Hayward faults. The seismic retrofit strategy of this alternative is based on isolating the superstructure from the substructure (towers and foundations). This work would include constructing additional large diameter piles and new pile caps around the existing foundations, strengthening and stiffening the towers, installing isolation bearings at the top of the towers, and strengthening and/or stiffening the superstructure truss members. Two

new large deepwater columns would be added to the cantilever span in the main navigation opening.

However, constrained by a 1930s level of material and construction technology and the complexity of the structure, it is impossible to retrofit the existing East Span to lifeline standards with any reasonable degree of confidence. The seismic capacity of many of the existing materials, the interaction of major structural elements during a seismic event, and the condition of existing foundations are all uncertain. Although substantial modifications to the East Span are proposed as a part of the Retrofit Existing Structure Alternative, it is nevertheless anticipated that substantial damage would occur as a result of an MCE and require extensive reconstruction or replacement. Potential modes of failure are the superstructure unseating from the towers, a failure of column support due to a lack of sufficient reinforcement, the concrete foundations snapping from the tops of the timber piles, structure members bending in the cantilever section, and mangled deck joints that could impede traffic. Replacement would be necessary if structural safety criteria could not be met through repairs to the damaged bridge.

If damage is such that repair of the cantilever section is feasible, this may require complete closure of the East Span from six months to one year. If, however, damage is sufficiently severe that replacement becomes necessary, the East Span would be completely closed for a substantially longer period of time.

The Retrofit Existing Structure Alternative would retrofit both the existing East Span and the East Viaduct section on YBI. The alignment of the bridge would remain unchanged and the bridge would remain a double-deck structure. (See Figures 2-4.1 through 2-4.4 in Appendix A.) Each deck roadway cross section would also remain the same, five 3.5-meter (11.5-foot) wide lanes with no roadway shoulders.

Portion of East Span in Bay

The seismic retrofit strategy for the Retrofit Existing Structure Alternative is based on strengthening and stiffening the substructure (below deck towers and foundations) and isolating the superstructure. Large-diameter piles would be added around the perimeter or on both sides of all existing foundations. New, larger pile caps would be constructed to join the expanded foundations with the existing foundations. Figures 2-5 and 2-6 (Appendix A) show the "before" condition and the "after" simulation of the retrofitted bridge.

The tower legs in the main navigation opening would be encased in concrete. Isolation bearings would be installed on the tops of towers to isolate the superstructure from the substructure and allow differential horizontal movements of approximately 1.2 meters (4 feet) between the two to minimize force transfer during earthquake events.

Two new columns (E2A and E2B) would be added to the cantilever main span just east of YBI (see Figures 2-4.1 and 2-4.2 in Appendix A for locations of new columns).

The seismic retrofit strategy would also add a new edge truss to restrict deformations in the cantilever section. An edge truss is a spanning horizontal truss beam that is extended from the bottom of the lower deck to the bottom of the upper deck (see

Figure 2-6 in Appendix A). Retrofitting truss members would include wind bracing and strengthening floor grid and vertical members.

Portion of East Span on Yerba Buena Island

The Retrofit Existing Structure Alternative would strengthen the East Viaduct and columns. The substructure of the East Viaduct would be retrofitted by enlarging and encasing selected columns and footings in concrete, adding cast-in-drilled-hole piles/tie-downs under the footings, enlarging the footings and the pile caps, and installing isolation bearings at the top of columns, and strengthening the deck by replacing expansion joints. Columns YB2, YB3, and YB4 would be encased in concrete and the foundations would be expanded.

2.2.6 Preferred and Least Environmentally Damaging Practicable Alternative (LEDPA)

In December 1998, after a thorough evaluation of project alternatives and consideration of comments from the public and agencies on the DEIS, Caltrans identified Replacement Alternative N-6, self-anchored suspension design variation, including a bicycle/pedestrian path, as its Preferred Alternative. In October 2000, FHWA also identified Replacement Alternative N-6 as the Preferred Alternative.

The Preferred Alternative has been identified as the Least Environmentally Damaging Practicable Alternative (LEDPA) by ACOE (on February 12, 2001) and EPA (on March 15, 2001). Documentation letters can be found in Appendix F. Identification of Replacement Alternative N-6 as the Preferred Alternative and the LEDPA in this FEIS has been coordinated through the NEPA/404 Integration MOU. The LEDPA is identified under the Federal Clean Water Act Section 404 (b)(1) alternatives evaluation process. The Section 404 (b)(1) process requires the ACOE, with input from the EPA, to make a determination of the LEDPA for any action involving discharge of dredge or fill material into waters of the U.S.

As a result of the alternatives analysis process undertaken for the East Span Project, it was determined that Replacement Alternative S-4 would have fewer permanent impacts to special aquatic sites protected by Section 404. Based on the 1999 eelgrass survey, Replacement Alternatives N-2 and N-6 would permanently affect 1.36 hectares (3.36 acres) of sand flats and 0.22 hectare (0.55 acre) of eelgrass, whereas Replacement Alternative S-4 would permanently affect 0.01 hectare (0.02 acre) of sand flats, 0.05 hectare (0.12 acre) of wetland and 0.15 hectare (0.37 acre) of eelgrass.

The "Guidelines for Specification of Disposal Sites for Dredged or Fill Material" (40 CFR 230) state that a Section 404 permit shall not be issued for discharge of dredged or fill materials into waters of the U.S. if there is a practicable alternative which would have less adverse impacts on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences (40 CFR 230.10(a). An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall purpose (40 CFR 230.10(a)(2)). Although Replacement Alternative S-4 would have fewer impacts on eelgrass and sand flats, it would pose several logistical problems that render it not

practicable. Replacement Alternative S-4 would take land from an operating USCG facility, thereby constraining the mission of that facility; it uses land from a Section 4(f) resource (Gateway Park) for which there are prudent and feasible alternatives that avoid that use; it compromises the operation of an important sewer outfall that serves over 610,000 people along the east side of the Bay; it results in more complex construction to protect that outfall; and it results in more extensive and more difficult in-Bay construction because of considerably greater depth to bedrock to construct the main span tower. As a result of these logistical impediments, Replacement Alternative S-4 does not meet the standards for practicability as defined in the Section 404 guidelines.

Replacement Alternatives N-2 and N-6 meet the Section 404 standards of practicability. The following are the key logistical benefits of these alternatives:

- Replacement Alternatives N-2 and N-6 avoid conflicts with the USCG base that is responsible for search and rescue operations, marine safety, vessel traffic management, and aid to navigation and communication in the Bay. The base operates 24 hours a day, 7 days a week. The USCG coordinates over 2,000 local emergency response requests each year. In 1999 alone, its YBI facility saved 180 lives and over $34 million in property. Its Vessel Traffic Service is essential for the safe passage of large ocean-going ships (such as those moving daily to and from the Ports of Oakland and San Francisco) and is important in protecting the Bay environment by averting maritime accidents. In a letter to Caltrans dated October 18, 2000, the USCG stated that a southern alignment for the East Span Project (such as Replacement Alternative S-4) would severely restrict USCG's flexibility to utilize that part of its already limited footprint. It further stated that a southern alignment would constrain USCG's ability to effectively conduct emergency service operations from YBI.

- Replacement Alternatives N-2 and N-6 avoid land on the Oakland Touchdown designated by the Oakland Base Reuse Authority (OBRA) for a proposed park. The proposed park was determined by FHWA to be protected by the provisions of Section 4(f) of the Department of Transportation Act. Under Section 4(f), the Secretary of Transportation may approve a transportation project requiring the use of publicly owned land of a public park only if there is no prudent and feasible alternative to using that land, and the project includes all possible planning to minimize harm to the park. FHWA's implementing regulations (771.135(a)(2)) state that alternatives that avoid Section 4(f) properties are not prudent and feasible if they have unique problems or unusual factors, or if the cost, social, economic, and environmental impacts, or community disruption resulting from such alternatives reach extraordinary magnitudes. Replacement Alternatives N-2 and N-6 were not found to involve unique problems, unusual factors, or environmental impacts that reach extraordinary magnitudes; they are both prudent and feasible alternatives that avoid the use of the public park by Replacement Alternative S-4. In addition, because all build alternatives result in Section 4(f) uses (please see Section 6.3 — Description of Section 4(f) Resources Used by Project Alternatives), Caltrans and FHWA evaluated the Section 4(f) uses to establish which alternative results in the least net harm to Section 4(f) resources. Replacement Alternatives N-2 and N-6

were determined to be the feasible and prudent alternatives with the least net harm to Section 4(f) resources. For a detailed evaluation of Section 4(f) resources, see Chapter 6 — Section 4(f) Evaluation of this FEIS.

- The alignments of Replacement Alternatives N-2 and N-6 provide easier access to bedrock to construct the main span tower than Replacement Alternative S-4. With Replacement Alternative N-2, depth to bedrock would be approximately 11-14 meters (36-46 feet) below the mudline, and with Replacement Alternative N-6, the depth to bedrock would be approximately 6-9 meters (20-30 feet) below the mudline. In contrast, the depth to bedrock for Replacement Alternative S-4 would be approximately 67-71 meters (220-233 feet) below the mudline. Easier access to bedrock for Replacement Alternatives N-2 and N-6 (easiest for N-6) would allow for shorter piles, which would reduce the overall seismic load demands on the main span tower. For construction of Replacement Alternative S-4, the tower would need to be longer to reach bedrock, thereby subjecting it to greater stresses in an earthquake. Its design would need to be more massive to provide the same seismic resistance provided by a shorter tower for Replacement Alternative N-2 or N-6. As a result, the foundation would also need to be more massive to support the longer and more massive tower. The greater depth to bedrock and the larger foundation together would increase the area of excavation and the quantity of excavated material requiring disposal. Placing a key structural element of the bridge in over 60 meters (200 feet) of soft sediments would present substantial logistical challenges during construction.

- Replacement Alternatives N-2 and N-6 avoid conflicts with East Bay Municipal Utility District's (EBMUD's) facilities and operations. They would not conflict with the sewer outfall or its dechlorination facility. The outfall is a concrete pipeline 2.8 meters (9 feet) in diameter, and the onshore portion of the pipeline is buried 0.5 to 1.5 meters (2 to 5 feet) below ground surface. This shallow layer of cover does not provide adequate protection for the pipe; it is a zero-load facility, meaning that the pipeline cannot support any weight and must be protected or spanned to prevent damage. The alignment of Replacement Alternative S-4 would obliquely cross an onshore portion of the outfall pipeline. The skew angle between the roadway alignment and the outfall pipeline, buried under minimal cover from 0.5 to 1.5 meters (2 to 5 feet) deep, would result in a conflict area on land that is approximately 400 meters (1,300 feet) long. Protecting and avoiding this 2.8-meter (9-foot) diameter, zero-load pipeline would substantially increase construction complexity in this area, in terms of both bridge design and constraints on the contractor. It would also hamper any future inspections and repairs of either the outfall or the bridge. Damage to the onshore outfall during construction of Replacement Alternative S-4 could cause release of secondarily treated effluent containing elevated levels of chlorine into the Bay.

Replacement Alternatives N-2 and N-6 are the practicable alternatives pursuant to Section 404 of the Clean Water Act, and they are also feasible and prudent alternatives with the least net harm to Section 4(f) resources. Replacement Alternative N-6 has been chosen as the Preferred Alternative over Replacement Alternative N-2 on the basis of greater ease of construction of the main tower based on geologic conditions,

aesthetic benefits such as enhanced drivers' views, and consistency with the regionally preferred alignment and design features as expressed by the MTC.

2.3 REPLACEMENT ALTERNATIVES DESIGN VARIATIONS

Replacement alternatives are proposed as two parallel skyway structures, each having five traffic lanes, inside and outside shoulders, and a bicycle/pedestrian path on the south side of the eastbound deck. Design variations identified for the replacement alternatives are limited to the type of bridge to be constructed over the main navigation opening. For the portion of the span between the east side of the navigational channel and the Oakland Touchdown, a skyway design (a span supported from under the bridge deck) is the most practical structure type because of the alignment, the geology, the seismic characteristics, shallow water, and deep Young Bay Muds in that area. Other structure types could be built in this area; however, because of the site conditions, they would substantially increase design and construction costs and the time needed to construct. Designing these other structure types to a lifeline standard would also be much more difficult.

It has been determined that for the main span, steel would be used to construct the main tower and superstructure and a steel/concrete composite would be used to construct the substructure. For the skyway, concrete would be used for the superstructure and concrete or a steel/concrete composite would be used for the substructure. For the Oakland Touchdown portion of the bridge, concrete would be used to construct the superstructure and the substructure.

Selection of the superstructure type to be used for the bridge was based on seismic engineering and cost analyses, material availability, maintenance requirements, and impacts to construction schedule. To minimize costs, the span lengths were maximized, which increased load demands. While a 5-meter (16.4-foot) deep structure depth is sufficient for most of the span, it is insufficient to resist the bending and shear demands at the piers, so the superstructure had to be deepened at those points. As a result, a "haunched", or slightly arched, design was selected for the superstructure. This type of superstructure is thick at either end where it sits on a column. (See Figure 2-23 in Appendix A).

2.3.1 Main Span Types

For the replacement alternatives, design variations were considered for the main span section that crosses the main navigation opening. A number of bridge types, as discussed below, were evaluated by MTC's Bay Bridge Design Task Force Engineering and Design Advisory Panel (EDAP) based on seismic performance, aesthetic considerations, costs, ability to construct the bridge as soon as possible due to seismic vulnerability, and the possible location of a bicycle/pedestrian path. The public had an opportunity to participate during this process at 34 Task Force and EDAP meetings and through letters, phone calls, and e-mails received by MTC. In June 1998, based on the recommendations of the EDAP, MTC voted for a self-anchored suspension design that includes a single tower of 160 meters (525 feet) in height above MSL and maintains the main navigation opening east of YBI.

EDAP's recommendation was based on seismic safety and the aesthetic value of the bridge. The seismic safety of the self-anchored suspension design was judged to be equal to that of the single-tower, cable-stayed span; however, its aesthetic value was judged to be greater and more visually consistent with the tradition of suspension bridges in the central Bay. In addition, this design involves fewer long-term maintenance costs than the cable-stayed design variation evaluated by the EDAP and allows for the optimum location of the tower foundation while providing a wider shipping channel. (See Appendix E for further detail on the MTC recommendation process).

Replacement Alternatives N-2, N-6, and S-4 could accommodate any of the three variations discussed below, although the optimum locations for the main span foundations could not be provided by all replacement alternatives due to limited access to bedrock.

Cable-stayed Design

The cable-stayed design includes the use of steel cables to connect the bridge deck directly to towers. Most cable-stayed bridges have a single tower which supports both decks or separate "H" towers that support each individual deck. A single concrete vertical tower was considered for the East Span Project (see Figure 2-12 in Appendix A). Cable-stayed bridges have been used in several different countries since the 1940s. Recent examples constructed in the United States include the Sunshine Skyway Bridge in Tampa, Florida, and the Thomas Bridge in Georgia.

The cable-stayed system allows for longer spans crossing the navigational channel than could be provided with a skyway variation which requires additional piers in the channel. However, any cable-supported structure imposes additional alignment constraints. To support the two decks from a single tower, the decks of each of the parallel bridge structures must be almost parallel and at the same approximate elevation for the entire length of the main span. The main span cannot begin until each deck alignment meets these constraints. The replacement alternatives under consideration have been set to accommodate the geometric requirements for a cable-stayed main span.

The cable-stayed design variation would exceed the USCG's minimum requirements for horizontal and vertical clearances of the main navigation opening.

The cable-stayed main span was estimated to cost approximately $100-$250 million more than the total estimated cost of an island-to-shore skyway replacement bridge.

Suspension Bridge Design (Preferred Design Variation)

The suspension design is a commonly used design for long channel crossings and has been used previously in the Bay Area on the Golden Gate Bridge and the SFOBB West Span. A classic suspension bridge has cables that are draped from towers and connected to anchorages founded on the ground at both ends of the main span. Vertical cables ("suspenders") support the bridge by connecting the draped cable to the bridge deck. While bedrock on YBI could be used for a west anchorage, bedrock is approximately 135 meters (443 feet) below the mudline for an east anchorage at the

Oakland Touchdown. The use of ground-founded traditional anchorage structures at this bridge site is therefore considered less feasible and less cost-effective relative to other options.

A self-anchored suspension design variation has been identified as the preferred design variation. In a self-anchored suspension bridge, the main cables are anchored to the ends of the main span deck, eliminating the need for ground-founded anchorage structures (see Figure 2-13 in Appendix A). The self-anchored suspension design variation suspends the bridge from a steel tower. Alignment constraints for the self-anchored suspension design variation are similar to those described for the cable-stayed design variation. Decks of the bridge structures must be almost parallel and at the same approximate elevation for the entire length of the main span. The main span cannot begin until each deck alignment meets these constraints. Although a self-anchored suspension bridge looks similar to more conventional suspension bridges, it is structurally different in that it uses the bridge deck as the integral structural component that balances the force usually taken by anchorages founded on the ground. The replacement alternatives under consideration have been set to accommodate the geometric requirements for a self-anchored suspension design variation.

The self-anchored suspension design variation exceeds the USCG's minimum requirements for horizontal and vertical clearances of the main navigation opening.

The self-anchored suspension main span was estimated to cost about $150-$300 million more than the total estimated cost of an island-to-shore skyway replacement bridge.

Skyway Design

The skyway design variation is a structure constructed of precast concrete supported by columns. With this structure type, eastbound and westbound bridges would be constructed as separate, independent structures. Under the skyway design variation, spans over the main navigation opening area could be a maximum of 150-170 meters (490-550 feet) in length. The skyway design variation would require three spans in the main span area, compared to two spans for both the cable-stayed and self-anchored suspension design variations. The skyway design does not require a complete tangent or straight section over the main span, which is needed to construct the cable-supported design variations. As a result, there could be a slight curve in the main span. An example of a skyway structure is depicted in Figure 2-14 in Appendix A.

The skyway design variation would meet but not exceed the USCG's minimum requirements for horizontal and vertical clearances of the main navigation opening.

A skyway design variation is considered as the baseline for cost comparison purposes. A skyway span was estimated to cost approximately $90 million.

2.4 COMPARISON OF ALTERNATIVE CHARACTERISTICS

2.4.1 Funding

The base budget for the East Span Project, established in Section 188 of the California Streets and Highways Code (CSHC), is about $1.285 billion. Project funding comes from a combination of state taxes, bond revenues, and moneys collected through a one-dollar bridge toll surcharge effective January 1, 1998, on all state-owned bridges in the Bay Area. Some federal funding is also being sought for the project. State taxes, in the form of state fuel tax revenues, are 33.3 percent of the project budget, state Seismic Retrofit Bond revenues will fund 30.2 percent of the budget, and the toll surcharges from state-owned Bay Area toll bridges will fund the remaining 36.5 percent.

The legislation creating the funding mechanism for the East Span Project established the Bay Area Toll Authority (BATA) (with the same board as the Metropolitan Transportation Commission) and authorized the Authority to collect the one-dollar toll surcharge for eight years, issue revenue bonds, and allocate revenues to toll bridge projects, including the East Span Project. On June 24, 1998, through BATA Resolution No. 10, the Authority chose to extend the one-dollar toll surcharge for an additional two years beyond the eight years to fund the inclusion of specified amenities. Extension of the toll surcharge for 15 months is anticipated to generate $230 million; amenities specified in Resolution No. 10 total $141 million: $50 million for a bicycle/pedestrian path and $91 million toward the self-anchored steel suspension main span. On September 22, 1999, through BATA Resolution No. 19, the one-dollar toll surcharge was extended for an additional 0.4 months to pay for rest areas, a planning and feasibility study of a West Span bike lane, and a concept study of improvements to the Transbay Transit Terminal. The incorporation of the two resolutions results in a $1.427 billion budget for the SFOBB East Span Project.

On June 28, 2000, the Authority approved a revision to BATA Resolution No. 19 to extend the surcharge for the remaining 8.9 months permitted by statute to fund the additional costs of the Bay Bridge West Span bicycle and pedestrian study ($1,020,000) and for the remainder ($84,430,000) to be placed in a reserve account.

The total base budget of $1.285 billion includes an allocation of $80 million for a cable-supported structure. The type of cable-supported structure is not specified in the CSHC. The design options presented in Section 2.3 include cable-supported structures. Funding of a cable-supported system costing more than $80 million would require the Authority to extend the one-dollar toll surcharge beyond the initial eight-year period.

Cable-supported design variations are included in the East Span Project description of replacement alternatives. The potential visual impacts of these design options are addressed in this document.

2.4.2 Costs

Estimated total costs for each of the alternatives identified above are listed in Table 2.4-1. These costs are based on 1998 estimates and are presented in 2002 dollars. Comparative life-cycle costs are presented in Table 2.4-2. These cost estimates are conceptual and are based on available information that was available in 1998 about the existing East Span, new proposed alignments, existing utilities, historic construction costs, and quotations from various local suppliers and contractors. These estimated costs range from zero for the No-Build Alternative to $1.65 billion for Replacement Alternative N-6, suspension design option. No-Build Alternative costs do not include the $19 million interim retrofit improvements that were completed during summer 2000.

In April 2001, Caltrans published updated cost information for the Preferred Alternative (Replacement Alternative N-6, suspension bridge design option). It reflects cost increases due to such factors as increasing construction costs in a robust and competitive local economy; significant increases in the costs of steel; schedule delays which magnified the inflationary effect; and additional design amenities such as the belvederes and a wider bicycle path than is standard. Caltrans estimates that the current cost of Replacement Alternative N-6, suspension bridge option, would be $2.6 billion.

Caltrans did not prepare updated cost estimates for the other project alternatives in April 2001. However, the most significant factors contributing to increased costs would apply to all of the build alternatives.

The enabling legislation for the project, Senate Bill 60, signed by then-Governor Pete Wilson in 1997, anticipated the possible need for additional funding beyond original estimates and required Caltrans to return to the Legislature if necessary. In accordance with Senate Bill 60, Caltrans has submitted its cost estimates to the Legislature and anticipates that it will address the need for additional funding within the next few months.

Based on a comparative cost study prepared by Caltrans in 1996, it is estimated that the bridge maintenance costs for the retrofit alternative over the projected 50-year life span of the existing structure would be $44 million. A replacement structure is expected to have a service life of 150 years. Life-cycle costs of replacement alternatives have not been developed for the projected 150-year life spans of the structures. A comparison of selected maintenance operations and repairs of the first 50 years of service indicated that differences among replacement alternatives are small (see Table 2.4-2). Comparing the life-cycle costs of the replacement structure in Table 2.4-2 to the maintenance costs of the retrofit structure

Table 2.4-1 Cost Estimate Summary

Alternative	Retrofit Existing Structure	Skyway ($ billion)			Cable-stayed Main Span Design Variation ($ billion)			Self-anchored Suspension Design Variation ($ billion)		
Alternative		N-2	N-6	S-4	N-2	N-6	S-4	N-2	N-6 (Preferred)	S-4
Structure and Roadway[a]	0.90	1.25	1.25	1.25	1.35 - 1.45	1.35 - 1.45	1.40 - 1.50	1.45 - 1.50	1.40 - 1.55	1.45 - 1.50
Dismantle Existing East Span	N/A	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Bicycle/Pedestrian Path	N/A	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Aesthetic Lighting	N/A	N/A	N/A	N/A	0.012	0.02	0.012	0.015	0.02	0.015
TOTAL Construction Cost[b] ($2002)	0.90	1.35	1.35	1.35	1.45 - 1.55	1.45 - 1.55	1.50 - 1.60	1.55 - 1.60	1.50 - 1.65	1.55 - 1.60

Source: SFOBB East Span Seismic Safety Project 30% Type Selection Report, Caltrans, May 1998.

Notes: [a] Cost estimates reflect the potential range in construction costs depending on skyway structure type rounded to the nearest 50 million. A haunched-concrete skyway structure is estimated to have the least cost, a uniform depth concrete skyway a mid-range cost, and a uniform depth steel structure the greatest cost.

[b] The cost information in this table represents the estimated cost of the various alternatives in 1998. The costs are relative to each other at the time that they were estimated. They do not represent the current costs of the alternatives, which would be greater, but still have the same relative relationship.

Table 2.4-2 Comparative Life-cycle Costs[a,b] ($ Million Escalated to 2002)

Skyway	Cable-stayed Main Span Design Variation	Self-anchored Suspension Design Variation
11	14	12

Source: SFOBB East Span Seismic Safety Project 30% Type Selection Report, Caltrans, May 1998.

Notes:
[a] Comparative life-cycle cost analysis estimates costs of maintenance and repair of the bridge over a projected life span (150 years) to better determine the overall bridge structure "value." A comparative analysis requires calculation of life-cycle costs of only those maintenance operations and repairs that are appreciably different for bridge design variations that are being evaluated. The table only reports costs for the first 50 years of the life span because beyond that period, it becomes increasingly difficult to make reliable estimates.
[b] For purposes of comparative life-cycle costs, differences between replacement alternatives were minimal.

($54 million in 2002 dollars) means that a new bridge, which would last 100 years longer, would be less expensive to maintain over the long term.

2.4.3 Constructibility

In addition to cost, "constructibility" provides a valuable comparison between the alternatives and options previously described. Constructibility encompasses the anticipated duration of construction, as well as any unusual delays, environmental issues, or risks associated with the construction process. The environmental impact issues are discussed in Section 4.14 — Temporary Impacts During Construction.

The No-Build Alternative would have no construction activity. Tasks would be limited to regular maintenance.

The Retrofit Existing Structure Alternative would include constructing two new columns in Bay waters to support the main span over the navigational channel. A total bridge closure would be necessary to connect the new columns to the cantilever section. This could be accomplished at night. During other activities, such as superstructure construction, numerous lane closures would be necessary but would be timed to minimize the impact on bridge users. Construction on the superstructure would be expected to last for the majority of the retrofit schedule, approximately six years.

The Retrofit Existing Structure Alternative is less safe for the traveling public and for Caltrans staff who will maintain the bridge during and after construction. Because there are no shoulders on the existing East Span, the construction zone for the retrofit would be highly constrained. Motorists would pass within close distances of the construction activities through the entire 4-kilometer (2.5-mile) long project, and construction equipment and workers would have to maneuver adjacent to passing traffic for the installation and removal of lane closures and other work on or above the five lanes.

Multi-staged construction and temporary detours would be required on YBI and the Oakland Touchdown area for all three replacement alternatives. Most of the construction in the Bay can be performed without affecting the existing roadways and bridge structure. The vast majority of the construction would be separated from the existing East Span. This separation would minimize traffic delays and safety hazards for construction crews, maintenance crews, and the traveling public. Caltrans is continuing to investigate lane and bridge closures to transition traffic from the existing bridge to the temporary detours and to a replacement bridge. Caltrans would plan the closures in an effort to simultaneously minimize public inconvenience, facilitate construction, and maximize public safety. The closures would be scheduled to occur during off-peak hours to the maximum extent feasible. Caltrans would implement a Traffic Management Plan to manage impacts to traffic.

A replacement alternative would also provide two standard shoulders to accommodate disabled vehicles and routine bridge maintenance activities. The replacement alternatives are expected to take five years to complete plus approximately two years to dismantle the existing structure, for a seven-year construction schedule.

2.4.4 Ability to Address the Project Purpose and Need

The No-Build Alternative would not meet the project purpose and need as described in Chapter 1 because it would not provide a lifeline vehicular connection between Oakland and YBI; would not maintain high levels of people, freight, and goods movement following an MCE; and would not correct deficiencies in design standards. The retrofit and replacement alternatives would meet the project purpose and need to varying degrees as summarized below.

The Retrofit Existing Structure Alternative would retain the vehicular connection between YBI and Oakland and would maintain the current vehicular capacity of the East Span. It would improve the seismic performance of the existing structure, enabling the bridge to withstand a seismic event, and potentially an MCE; however, it would not meet lifeline criteria. In the event of an MCE, it is anticipated that major damage to the bridge could occur. Post-earthquake repair of the bridge could require closure of the SFOBB for several months, removing the SFOBB as a transportation link and, if damage is excessive, impeding the bridge's ability to provide emergency relief access. Replacement or repair of the bridge following an earthquake could require closure of the SFOBB for years, depending on the degree of damage.

Opportunities to improve operational safety elements of the East Span would not be possible under the Retrofit Existing Structure Alternative. The retrofit alternative would not permit changes to the existing roadway design; therefore, current roadway design standards could not be attained (see Section 1.2.3 — Current Roadway Design Standards).

Each of the replacement alternatives would continue to provide a connection between YBI and Oakland and would provide a lifeline connection between West and East Bay communities. The replacement alternatives would be constructed to withstand an MCE, providing for safety of bridge users during an earthquake. As a lifeline structure,

the span would continue to provide a critical connection between San Francisco, the East Bay, and the I-80 corridor to the east. The span would provide post-earthquake transportation service for emergency response and support for the economic livelihood of the Bay Area.

The replacement alternatives would meet current roadway design standards to the maximum extent feasible. Replacement alternatives would maintain existing vehicular capacity on the East Span by providing five travel lanes in each direction, including provision of standard 3.6-meter (12-foot) wide traffic lanes and inside and outside (3-meter [10-foot]) shoulders. The replacement alternatives would also conform to current horizontal and vertical alignment, superelevation, clearance, and stopping-sight distance standards as defined in Section 1.2.3 — Current Roadway Design Standards of this report.

2.5 ACCOMMODATION OF MULTI-MODAL STRATEGIES

The SFOBB is within an important corridor of transbay travel between San Francisco and the East Bay. The bridge is currently a multi-modal highway facility that is used by public and private vehicles, trucks, buses, carpools, and vanpools. The corridor is also served by Bay Area Rapid Transit (BART), which provides rapid rail service via the submerged BART "tube," and a network of ferries.

Based on available data, approximately 36,000 people travel through the Transbay Corridor during the weekday morning peak hour in the peak direction (westbound). The following table summarizes existing person trips in the Transbay Corridor by mode:

	Single-/Double-Occupant Vehicles	Carpools/ Vanpools	Buses	BART	Ferries	Total
Number of Person Trips (AM peak hour, westbound)	8,900	9,400	3,100	14,000	400	35,800

Source: Caltrans, September 1997, June 1998, and May 2000.

Because the SFOBB is a critical regional facility whose approaches are severely congested during peak periods, the feasibility of incorporating an additional high-occupancy transportation facility within the corridor (either road- or rail-based) was evaluated. The purpose of such a facility would be to increase mobility within the corridor.

Due to the scale of the project, some members of the regional community urged that congestion relief be included as part of the project purpose in addition to providing a vehicular lifeline connection. The scope of the project was not expanded to include congestion relief, because this would have resulted in lengthy public and agency debate about how best to implement a congestion relief solution. This would have

caused the seismic safety component of the project to be substantially delayed. Caltrans anticipates beginning construction of this critical safety project in fall 2001. This would not have been possible if the scope of the project had included congestion relief.

2.5.1 Historical Background

Rail service was provided on the SFOBB from 1939 to 1958 by the Key System. The Key System was an electrified interurban light-rail system that utilized the south side of the lower deck of the East and West Spans of the SFOBB. It shared the lower deck with trucks and buses while automobile traffic only traveled in six lanes on the upper deck. The Key System commenced operation in 1939 and continued service until 1958. From 1939 to 1941, two other rail lines, the Interurban Electric and the Sacramento Northern, also operated on the SFOBB.

The Key System connected Oakland and Berkeley with San Francisco. The system terminated in San Francisco at the Transbay Transit Terminal where passengers could transfer to the San Francisco Municipal Railway system (Muni). In total, the Key System trains operated on 106 kilometers (66 miles) of track on the SFOBB and in the East Bay. It served the East Bay cities of Richmond, El Cerrito, Albany, Berkeley, and Oakland. The Key System also operated transbay buses.

Patronage on the Key System peaked in 1945 with 26.5 million annual passengers, with an average daily ridership of about 102,000 (including both trains and Key System buses). By 1957, ridership had declined to about 5.2 million annually (about 17,000 average daily riders).[1] As a result of the decrease, the Key System rail lines were abandoned, and the routes were converted to Alameda-Contra Costa Transit District (AC Transit) bus service in 1958.

When Key System rail service ended, the lower deck of the SFOBB was converted to automobile use. To accommodate these changes, substantial modifications were made in San Francisco, on the SFOBB, and in the Oakland Touchdown area. New vehicle access to and from the SFOBB was constructed in San Francisco; tracks at the Transbay Transit Terminal were converted to bus lanes, and buses were rerouted onto the former rail access in the Terminal; track, ties, and other railroad facilities were removed from the lower deck of the SFOBB; and new roadways to and from the SFOBB were constructed in Oakland. Load capacity from the rail system was used to allow modern traffic loadings on the bridge, including truck traffic in any of the lanes on the top deck.

[1] Demoro, Harre W., *The Key Route: Transbay Commuting by Train and Ferry*, 1985.

2.5.2 MTC SFOBB Rail Feasibility Study

Background

In November 1998, voters in the cities of San Francisco, Berkeley, Oakland and Emeryville passed an advisory ballot measure requesting that the feasibility of passenger rail on the SFOBB be studied by MTC. In response to this measure and general public interest, MTC studied transit service options in the Transbay Corridor, especially the possibility of rail (see MTC letter dated December 16, 1998, that was sent to the Mayors of Berkeley, Emeryville, Oakland, and San Francisco in Appendix G). Concurrently, MTC prepared two studies: a long-term capital and operating cost analysis for various transit options for the Transbay Transit Terminal, as well as a feasibility analysis of rail on the SFOBB. Because the SFOBB and the Transbay Transit Terminal are linked by function, the technical analyses conducted in each study have been coordinated and are based on shared assumptions and data.

There are two phases in the Bay Bridge Rail Alternatives Study. Phase I explored the technology options for placing rail on the SFOBB and assessed the structural feasibility and modifications that would be required for the retrofitted West Span, YBI and the new East Span of the SFOBB as currently proposed. Phase I also identified potential SFOBB rail alignments in the East Bay and in San Francisco. A final report was completed in July 2000.

The work scope for Phase II of the study will be incorporated into the Bay Crossing Study to be completed by MTC by fall 2002. MTC will study non-SFOBB transbay rail crossings, including new tubes for rail or BART, additional or expanded auto bridges with or without rail, and enhancements to existing transbay transit services, including BART, transbay buses, and ferries.

The following working papers and final report were prepared for MTC's SFOBB Rail Alternatives Study:

- Working Paper 2A.2: "Initial Definition and Description for Bay Bridge Rail Options," July 28, 1999;
- "Structural Assessment of Rail on the Bay Bridge: Summary Report," October 22, 1999;
- Working Paper 2A.3: "Structural Assessment of Rail on the Bay Bridge," October 22, 1999;
- Working Paper 3A.1: "Operational Description of Bay Bridge Rail Alignment Options," Draft, November 29, 1999; and
- Final Report, "Bridge Rail Feasibility Study," July 2000.

These documents are available from the MTC Library, 101 8th Street, Oakland, California.

MTC Findings

Structural Feasibility and Costs. The structural feasibility of rail on the SFOBB was analyzed in the MTC study. This study analyzed four types of rail vehicles: light rail

(LRT), BART, commuter rail, and high-speed rail. These vehicles vary by their loaded car weight and the rail envelope size.

The East Span replacement alternatives, as currently being designed by Caltrans, would have the structural capacity to accommodate one railroad track for LRT on the inside of each deck (north side of eastbound deck, and south side of westbound deck), four travel lanes with no shoulders, and live loads representing BART and LRT vehicle types. The MTC study found that additional strengthening beyond the established design criteria would be required if five travel lanes or vehicle types with higher live loads were desired. The placement of rail on the inside of each of the side-by-side decks limits the options for crossing YBI and connecting to the West Span. The MTC study notes that "...moving rail to the outside of the decks would provide the needed flexibility, allowing for new tunnel bores to be constructed without impacting current traffic operations."[2]

The MTC study also observes that the feasibility of an SFOBB rail system would also be constrained by the structural requirements for rail on the West Span. The MTC structural assessment study identified two rail configurations that would accommodate rail on the West Span. Both configurations would require extensive modifications, in addition to the West Span retrofit that is currently under way. The cost for the modifications would range from $3.06 billion (Rail Suspended Below the West Span Lower Deck option) to $3.33 billion (Rail Cantilevered from the West Span Lower or Upper Decks option). These estimates include the cost of strengthening and modifying the West and East Spans to accommodate rail and four travel lanes, new tunnels through YBI, and a new tunnel or structures to Harrison Street in San Francisco. The costs do not include a structure to carry rail beyond the SFOBB Toll Plaza, structure or tunnel to the Transbay Transit Terminal in San Francisco, or costs of the rail tracks or other infrastructure to operate a rail system.

Rail Service Options. The MTC study identified four rail service options for operating rail on the SFOBB. The study notes that these options would serve different, potentially large markets but were not based on detailed analyses of demand or potential patronage.

Alternative A – Transbay Light Rail Service. This option, considered a modern version of the Key System, would connect the Transbay Transit Terminal with several trunk lines in the East Bay with LRT. Frequent all-day service would be provided.

Alternative B – BART Transbay Bridge Service. This option would take one of the existing transbay BART lines and move it to the SFOBB, expanding the capacity of BART's peak hour transbay service. For purposes of the MTC analysis, it was assumed that the SFOBB BART would connect to the bridge via a direct connection with BART's MacArthur station.

[2] Metropolitan Transportation Commission, "Structural Assessment of Rail on the Bay Bridge," Working Paper 2A.3, October 22, 1999.

Alternative C – Basic Bridge Railroad Passenger Service. This option identifies rail service that would link the Peninsula and the East Bay via the Transbay Transit Terminal and the SFOBB. Both electrified commuter rail and high speed trains would operate on this alignment on a skip-stop "A-train/B-train" operating plan, as described in MTC's "Blueprint" concepts for Caltrain.[3] "A" and "B" trains would operate on 30-minute headways, resulting in 15-minute headways between major stations. In the East Bay, commuter rail trains would merge with the existing Union Pacific corridors both north and south of the SFOBB. To the north, some of the trains would extend to Sacramento as part of Capitol Corridor service. High speed rail would terminate at a new station in West Oakland.

Alternative D – Aggressive Bridge Railroad Passenger Service. This option is basically identical to Alternative C. However, for Alternative D, the northern "A" and southern "B" branches would extend beyond central East Bay core cities. Frequency of service would also be improved. Northbound trains would continue to Martinez with half of the trains continuing to Suisun-Fairfield. Some trains would be extended to Sacramento. High speed trains would operate over the SFOBB every 30 minutes, with every train continuing to Sacramento. The southbound commuter rail line would extend to San Jose.

Rail Infrastructure and Rolling Stock Costs. The MTC study estimated the capital costs of implementing each of the rail options, including infrastructure and rolling stock. Operational costs were not included in these estimates but they would be substantial. Total infrastructure and rolling stock cost estimates are summarized below:

- Alternative A - $1.6 to 1.8 billion
- Alternative B - $1.94 billion
- Alternative C - $918 million
- Alternative D - $4.77 billion

Therefore, the MTC study estimated that the total cost of rail implementation, including bridge structural modifications, rail infrastructure, and rolling stock would be between $4 billion and $9 billion.

Structurally, rail is feasible on the SFOBB; however, there are numerous non-structural issues that have not been examined, such as system-wide operations, routing, costs, attaining ridership, acquiring right-of-way, and resolving environmental issues.

2.5.3 Operational Issues

This section evaluates the potential operational impacts of implementing an HOV lane or rail on the East Span.

In general, the existing East Span or a replacement span could physically accommodate an HOV lane without additional right-of-way. A replacement East Span,

[3] Metropolitan Transportation Commission, "Transportation Blueprint for the 21st Century," March 1999.

as currently designed, could also accommodate rail service. Rail service would require the use of one travel lane in each direction, reducing the capacity of the East Span to four travel lanes. Significant modifications to the current design would be necessary to accommodate rail service and five travel lanes.

The operational impacts on vehicular flows due to the loss of one travel lane with either multi-modal strategy are described below.

HOV Lane

An HOV lane on the SFOBB is evaluated as an extension of the existing HOV facilities at the San Francisco and East Bay approaches. Under this scenario, one of five mixed-flow lanes on the SFOBB (in both the eastbound and westbound directions) would be converted to an HOV lane. The HOV lane would be a dedicated facility for use only by vehicles with three or more people. Because right-of-way constraints on the existing or replacement East Span would preclude the use of barriers or buffers, the facility would be separated from mixed-flow traffic by striping and signing only.

An HOV lane on the SFOBB would adversely affect mobility in the Transbay Corridor, compared to the SFOBB facility without an HOV lane. During the morning peak period, the existing HOV lanes and metering signals at the SFOBB Toll Plaza operate together as a system to ensure that the capacity of the five westbound lanes on the SFOBB is maximized. As the HOV lane volume varies during the peak period, the mixed-flow metering rates are adjusted accordingly to maintain capacity flow for five lanes on the bridge. During the peak hour when the HOV volume exceeds the capacity of a single HOV lane, total vehicular capacity could be maintained if one of the five lanes on the bridge is operated as an HOV lane. The metering signals would release fewer mixed-flow vehicles as the excess HOV demand shifts into the mixed-flow lanes. However, the HOV volume before and after the peak hour would be less than the capacity of an HOV lane. Since mixed-flow vehicles would be restricted from using the HOV lane, total vehicular capacity would be less than the existing capacity as the excess HOV lane capacity would go unused. This would result in additional congestion on the approaches to the SFOBB. It is likely that the additional congestion would increase to the point of restricting access to the HOV lanes, particularly for the I-580 and I-880 approaches.

Other constraints associated with implementing the HOV lane on the SFOBB would be the result of the physical integration of the lane with existing HOV lanes, ramps, and SFOBB approaches. Substantial physical modifications, such as an HOV flyover (to connect the existing westbound HOV lanes, including the HOV flyover constructed as part of the I-880/Cypress Freeway Replacement Project, with a new HOV lane) and/or new ramps at YBI, would be necessary to minimize impacts to traffic flow operations. Therefore, costs associated with implementation of the HOV lane could be substantial and there would be no net change in person trip throughput on the bridge.

Rail

If rail on the SFOBB were implemented, one travel lane and one shoulder in each direction on the East Span would need to be converted to rail use. The loss of a traffic lane on either span would substantially impact SFOBB traffic operations. The vehicular

capacity of the proposed East Span would be reduced by 20 percent. However, to accommodate rail on the existing West Span deck, it would need to occupy two travel lanes, reducing the vehicular capacity by 40 percent. This is because the West Span does not have shoulders. Consequently, the vehicular capacity of the East Span would also be reduced by 40 percent because traffic flow on the East Span would be constrained by the lowest capacity available in the corridor. As a result, about 7,300 morning peak-hour westbound person trips (4,000 vehicle trips per hour) would be displaced. (These figures are based on counts taken by Caltrans in May 2000 at the SFOBB Toll Plaza.) If this significant loss in vehicle capacity was not made up through rail ridership, it would increase the existing congestion levels on the approaches to the SFOBB for mixed-flow vehicles, as well as create delays for vehicles accessing the existing HOV facilities.

To maintain or increase the person throughput capacity of the SFOBB due to the loss of vehicle capacity as a result of rail on the bridge, the rail system must attract all of the displaced person trips (about 7,300 morning peak-hour, westbound person trips).[4] The ability of the rail system to attract new transit trips is not solely dependent on the SFOBB segment; instead, the rail system must provide a superior mode choice in terms of travel time, convenience, cost, and reliability compared to driving. It must also not duplicate service already provided by either AC Transit, BART, or ferries. These factors would limit the number of displaced person trips to be attracted to the rail system. Further, to be successful, any new rail system would need a supporting feeder infrastructure. Rail lines, terminals, parking areas, and new bus lines would need to be developed to deliver riders to the system. Future improvements on the other existing modes would also affect new rail system ridership by providing capacity increases in the corridor. The implementation of BART's Advanced Automatic Train Control (AATC) will allow BART to increase its capacity to 21,000 passengers during the peak hour.[5] The AC Transit Transbay Comprehensive Service Plan calls for 140 westbound, morning peak-hour buses in the future, about an 80 percent increase over existing levels.

2.5.4 Institutional and Funding Issues

Institutional and funding issues related to implementation of either a road-based or a rail-based multi-modal strategy are summarized below.

- **Multi-modal strategies have not been identified as necessary in any regional planning process or document.** MTC is the regional agency responsible for programming, transportation planning, and financing within the

[4] A Transbay Corridor LRT system with a passenger capacity of 6,800-7,800 passengers per hour per direction could offset the displaced person trips if all train cars were filled to capacity. Such a system could have the following characteristics: units with a maximum capacity of 135-155 passengers per train car, trains of up to four vehicles in length, and peak-period headways of five minutes or less. A Transbay Corridor system may have different characteristics depending on the technology and equipment chosen for the system. It is important to note that it is not known without further study if ridership on a Transbay Corridor system would reach capacity levels.

[5] 30 transbay trains per peak hour x 10-car train lengths x 70 seats = 21,000 peak-hour passengers. Source: Bay Area Rapid Transit, "FY 2001 Short Range Transit Plan, Draft," May 2000, and "The Capital Improvement Program, FY 2001, Draft," May 23, 2000.

nine-county San Francisco Bay Area. It functions both as the regional transportation planning agency and as the region's MPO. These designations are mandated through state and federal legislation, respectively.

The SFOBB is a component of the I-80 Corridor, an important corridor in the Bay Area for commute travel, freight movement, and recreational travel. It has been studied extensively by regional planning organizations such as MTC and local transit agencies. These studies include:

- MTC's Bay Crossing Study (1991);
- HOV Lane Master Plan (1997);
- Interstate 80 Corridor Study (1987);
- Phase I ACR 132 Intercity Rail Corridor Upgrade Study (1989);
- Greater East Bay Rail Opportunities Coalition's Commute Rail Operating Plan (1994);
- AC Transit's Alternative Modes Analysis (1993);
- Transbay Comprehensive Service Plan (1998);
- Caltrans' Rail Passenger Program Report 1993/94 - 2002/03 (1993);
- California High Speed Rail Commission studies;
- MTC's Blueprint for the 21st Century (1999); and
- MTC SFOBB Rail Alternatives Study (2000).

These studies identified existing and future system deficiencies and travel demand and evaluated improvement strategies, such as HOV lanes, improved ferry service, LRT corridor identification, and commuter rail service. None of these studies has identified an HOV lane or a rail-based system on the SFOBB as a preferred improvement strategy, although AC Transit has requested that Caltrans study an HOV lane on the SFOBB. Caltrans evaluated such a facility in October 1994.[6] The MTC SFOBB Rail Feasibility Study identified preliminary estimates of the cost of SFOBB rail, structural modifications to the East and West Spans, and possible service operating scenarios. The study did not estimate potential ridership or identify environmental constraints.

Because none of these studies has identified an HOV lane or rail on the SFOBB as a preferred strategy, neither of these multi-modal strategies has been included in either the Track 1 or Track 2 project lists of the MTC's 1994 RTP or its 1996 and 1998 updates, including a 1999 amendment.[7] The planning horizon for the RTP is 20 years. MTC could include the multi-modal strategies in subsequent RTPs if the projects are consistent with local and regional objectives and strategies for

[6] Caltrans District 4 Highway Operations, *Effects of Proposed Changes to Bay Bridge HOV Operation*, October 19, 1994.

[7] The Regional Transportation Plan, which MTC prepares, is a comprehensive guide for the development of mass transit, highway, airport, seaport, railroad, bicycle, and pedestrian facilities within the Bay Area for the next 20 years. Track 1 refers to the list of regional transportation projects financially committed to in the past, as well as projects that maintain and operate the existing transportation infrastructure. Track 2 projects are regional transportation projects that do not yet have regional consensus or complete funding. MTC also allocates state and federal funds for transportation projects based on compatibility with this plan. The RTP is updated every two years through a public participation process to reflect a changing funding picture and the changing status of projects in Track 1, as well as to address new findings that emerge from corridor studies and Track 2 consensus building.

congestion management. In addition, neither multi-modal option was included in a recently enacted statewide funding package for transportation improvements (Governor's Traffic Congestion Relief Program [TCRP], July 2000).

- **No funding has been programmed or identified for either strategy.** MTC recently estimated the cost to implement rail on the SFOBB to be between $4 and $9 billion, depending on the technology used, and the infrastructure and bridge structural modifications required. The structural modifications to both the proposed East Span and West Span to accommodate rail would cost between $3.06 and $3.3 billion. The MTC study noted that heavy rail could be accommodated on the East Span with significant and costly modifications to its current design.

  No cost estimates have been prepared for implementation of an HOV lane on the SFOBB but they would likely be less than rail. Costs may include modifications to existing ramps or construction of new ramps; these costs may be substantial.

  The construction and operation of the facilities required to implement an HOV lane or rail system would require additional funding and sources of funding beyond those committed to the East Span Project. Replacement bridge types and amenities for which funding has been allocated by state legislative action do not include construction of HOV or rail systems (see Section 2.4.1 — Funding). Other local, regional, state, and federal sources fund multi-modal projects. However, since costs to build, operate and maintain the existing local and regional transportation system exceed available transportation funding sources by $7 billion over the next 20 years, it is assumed that existing sources of revenues would remain committed in the foreseeable future to support existing transit services and expenditure priorities.[8] Commitment of new potential funding and funding sources for multi-modal projects on the SFOBB will depend on the political and economic environment in the future.

- **Both strategies would require new institutional arrangements to implement and operate the facilities.** Neither the HOV lane nor a rail system is currently identified as a regional transportation priority. Before either can be included in the RTP, new institutional arrangements would be required, such as the identification of a governing body to operate the rail system. This body would not be created until there is regional consensus and agency interest in the strategies. This consensus does not currently exist.

The East Span Project's purpose is to provide a seismically upgraded vehicular crossing between YBI and Oakland. Although multi-modal strategies were evaluated as part of the alternative definition process, no multi-modal strategies are within the purpose and scope of the SFOBB East Span Project.

The East Span Project would maintain the current vehicular capacity of the existing East Span. The implementation of any multi-modal strategy on the SFOBB would be

[8] Metropolitan Transportation Commission, "1998 Regional Transportation Plan for the San Francisco Bay Area," August 1998.

subject to independent evaluation and funding as a separate project in the future. Not all rail systems could be accommodated by the East Span Project without significant modifications to the currently proposed design; however, the East Span Project does not create any additional obstacles to implementing a rail project, or other technologies, in the Transbay Corridor in the future.

The near-term implementation of either a road- or rail-based high-occupancy transportation multi-modal strategy would be constrained by several factors. Planning, funding, and implementing new transit services, which would be integrated with the existing transportation system in the Bay Area, would take substantially longer than the East Span Project would take to build. Implementing an HOV lane or rail-based transit facility on the East Span without additional infrastructure improvements, such as grade-separating structures or barriers, would adversely impact traffic operations on the approaches at either end of the bridge.

2.6 CONSTRUCTION ACTIVITIES

Similarities Between Construction of Alternatives

The retrofit and replacement alternatives have similar construction issues with respect to scale of work, in-water construction, and extent of laydown areas on YBI and the Oakland Touchdown area.

Scale of Work

Construction of the retrofit and replacement alternatives would require use of large-scale construction equipment and would involve labor-intensive construction activities. Noise emitted from driving large piles would be similar for the retrofit and replacement alternatives. The construction period for all build alternatives is anticipated to be approximately 6-7 years, including dismantling of the existing bridge under the replacement alternatives.

In-Water Construction

For all build alternatives, barges would be used for material delivery, dredging, drilling, pile driving, lifting, pile extraction, constructing cofferdams, and dismantling. Special barges and lifting equipment would be used to accommodate heavy equipment needed to support large-scale pile drivers. In areas of shallow water, some construction would take place from trestles and barges, and in deeper water, construction would take place from barges.

In-water construction activities would have similar impacts on the movement of commercial vessels and recreational boats, which would be diverted from construction areas. The main navigation opening near YBI would remain open during construction. The width would be reduced during construction, but not less than the minimum width required by the USCG.

Dredging would be required for portions of both the retrofit and the replacement alternatives for excavation, for cofferdams, and to accommodate barge access because some locations have water depths that are shallower than the draft of a barge. The anticipated maximum draft for the barges is 3 meters (10 feet). To ensure

adequate clearance over potential irregularities in channel depth, to allow for some potential resettlement of materials in the channel after dredging and ""listing of barges during heavy lifts, the channel would be dredged to a depth of 3.6 meters (12 feet) adjacent to the Oakland Touchdown and 4.3 meters (14 feet) for the rest of the access channel. Dredging to a depth of 4.3 meters (14 feet) would also be required northeast of the USCG facility on YBI for Replacement Alternative S-4.

Construction Staging Areas on Yerba Buena Island and Oakland Touchdown

Construction laydown and access areas would be needed on YBI and at the Oakland Touchdown area for construction storage and staging. The entire eastern end of YBI would be required, except for Building 262 and the structures and some landscaped areas in the Senior Officers' Quarters Historic District. A dock and vessel mooring facility would be constructed near the Parade Grounds and/or offshore from the eastern end of the island to facilitate the delivery of material and equipment from barges. Access to the Oakland Touchdown construction area would most likely be from surface streets located south of I-80, such as Burma Road.

2.6.1 Retrofit Existing Structure

Retrofit construction would require large-scale construction equipment and labor-intensive construction activities. Equipment used for construction of the retrofit would include delivery trucks, cranes, barges, dredges, pile drivers, concrete mixers, batch plants, cofferdams and forms, excavators, backhoes, and manual equipment to remove rivets and add bolts. The sequencing of work would depend largely on the contractor, but it is anticipated that construction activity would not be in progress concurrently along the entire length of the existing bridge. Construction is estimated to require six years to complete.

A possible construction scenario for the retrofit alternative is summarized below. Activities are described for three distinct construction areas: YBI, the Oakland Touchdown area, and in the Bay. Additional information on construction activities, impacts, and avoidance and minimization measures can be found in Section 4.14 — Temporary Impacts During Construction Activities.

Yerba Buena Island

Equipment, materials, and work crews would be transported to YBI by motor vehicles and/or barges. Contractors would require construction laydown and access areas on YBI to retrofit the YBI East Viaduct and retrofit Columns YB2 through YB4 and E1 (Figure 2-4.1 in Appendix A) and for construction storage and staging for the entire retrofit. The contractor would be responsible for arranging additional space requirements. It is anticipated that, except for Building 262 and the structures and some landscaped areas in the Senior Officers' Quarters Historic District, all open spaces on the eastern end of YBI would be required for construction staging. Construction activities on YBI are expected to include soil and rock removal to expand and supplement footings for columns on the island and to install concrete enclosures for the towers at Columns YB2, YB3, and YB4.

Oakland Touchdown Area

No retrofit activities are anticipated in this area because retrofit work was completed for bents east of Bent 22 in March 1998. However, portions of the Oakland Touchdown area may be used for construction staging, equipment storage, and parking for work crews.

In the Bay

Construction in the Bay would take place from barges and/or trestles. Substructure (below bridge deck) activities would consist primarily of expansion of existing footings, pile caps, and columns, which may require removal of some existing material such as concrete. In areas of shallow water at the Oakland Touchdown, cofferdams would need to be constructed to provide work access at each column where foundations are being expanded. Dredging would be required to provide an access channel in shallow water for barges. Dredge quantities for the retrofit alternative are shown on Table 4.14-4. In areas of deeper water, prefabricated pile caps would be used to retrofit the columns.

Tower strengthening would be required to minimize the damage or instability that would occur during a large earthquake and to reduce displacements at the top of the tower to manageable levels. This would be achieved by encasing either whole towers or tower members in concrete. The steel towers at Columns YB2, YB3, and YB4 would be completely encased in concrete; the steel members of the towers at Columns E6 to E8 and E10 to E22 would be encased in concrete.

All foundations, except for that of Column E9, would also be strengthened to reduce and manage the displacement of the foundations.

At Columns YB2 to YB4, cast-in-drilled-hole concrete piles would be used to surround the existing spread footing foundations. The new pile caps would enclose the modified footings.

The existing timber pile foundations from Columns E6 to E16 would be strengthened and stiffened by installing a total of 44 large capacity 1.5-meter (5-foot) diameter cast-in-steel shell pipe piles around each existing column footing. A reinforced and prestressed concrete pile cap would fix the top of the new piles and surround the existing column to strengthen it and connect it to the new piles.

The existing timber pile foundations from Columns E17 to E23 would be strengthened and stiffened by installing a total of 36 large capacity 1.5-meter (5-foot) diameter steel pipe piles at the north and south ends of each existing column footing. A reinforced and prestressed concrete pile cap would fix the top of the new piles and surround the existing column to strengthen it and connect it to the new piles.

In addition, two new columns, E2A and E2B, would be constructed to support the existing cantilever structure (see Figures 2-4.1 and 2-4.2 in Appendix A). The towers for the new columns would be constructed of concrete and would be approximately 30 meters (98 feet) tall. The large diameter steel pipe piles for the new columns would need to be driven deep into the Bay mud to be founded on stable bearing materials.

For Column E2B, the distance to bedrock would be nearly 91 meters (300 feet) below Mean Low Water (MLW). Construction of the new columns would require large-scale construction equipment to drive large-diameter piles, approximately 3 meters (10 feet) in diameter, into stable Bay bottom sediments or rock. Pile drivers would be mounted on deep-draft barges.

It is anticipated that retrofit activities in shallow-water areas near the Oakland Touchdown would be conducted from barges and temporary trestles constructed adjacent to the existing East Span. Dredging would be required to provide barge access in locations where the water depth is shallower than the draft of a barge.

Superstructure

Retrofit of the superstructure would include any construction on or above the lower roadway deck. Isolation bearings would be installed on top of the towers at the connections to the steel truss superstructure. Many of the truss elements adjacent to and above traffic would be strengthened and stiffened. Cross members of the truss would be strengthened or stiffened by adding steel plates, replacing rivets with high-strength steel bolts, and replacing lattice members with solid members or plating them.

A steel space frame (external edge truss) may also be used to strengthen portions of the cantilever section. These frames would extend from the top roadway deck to the lower roadway deck. In addition to the space frame, elements of the cantilever truss at the top would be removed to help isolate each of the cantilever segments from each other.

2.6.2 Bridge Replacement Alternatives

Construction of any of the replacement alternatives would require use of large-scale construction equipment, but because numerous pre-cast materials would be used with a replacement alternative, construction activities would not be as labor-intensive as with the Retrofit Existing Structure Alternative. The replacement alternatives are expected to take five years to complete plus approximately two years to dismantle the existing structure, for a seven-year construction schedule. Traffic would be diverted onto the new structure before the existing bridge is removed. As a result, seismic safety and lifeline criteria would be achieved for westbound traffic four years after the start of construction and, for eastbound travelers, five years after the start of construction.

Possible construction scenarios for a replacement alternative are summarized below. Activities are described for three distinct construction areas: YBI, the Oakland Touchdown area, and in the Bay. Additional information on construction activities, impacts, and avoidance and minimization measures can be found in Section 4.14 — Temporary Impacts During Construction Activities.

Yerba Buena Island

Temporary Construction Easements. The land within the existing easement held by Caltrans on YBI would be insufficient for all of the project's staging and construction area requirements. While the contractor would be responsible for

arranging additional construction space requirements, it is anticipated that all open spaces on the eastern end of YBI would be required for construction staging, except for Building 262 and the structures and some landscaped areas in the Senior Officers' Quarters Historic District. A portion of the northern temporary detour would be built in landscaped areas of the Historic District. The Parade Grounds would be used for temporary administrative offices (trailers), parking, maintenance, equipment and material storage, and related activities.

Arrival of Material and Work Crews. Equipment, materials, and work crews would be transported to YBI either by motor vehicles or by barges. Trucks would use Macalla Road to deliver materials. Materials delivered by truck, during non-peak traffic hours, if feasible, may include cement, reinforcing steel, prestressing steel, structural steel for the temporary detours, falsework material and form lumber. Barges would be used to deliver larger structural segments of the bridge (piles for the tower and structural steel for the tower and main span deck). Cranes situated at locations within the temporary construction easement and/or contractor-leased work areas on the island would be used to lift materials into place. Also, some material trucked to YBI would be loaded onto barges and barged to construction sites along the bridge.

Mobilization/Grading. Grading would occur in the area surrounding the temporary detours and new structures, the Parade Grounds, and hillside areas to provide access for cranes, delivery vehicles, and other construction. Some of the most extensive grading would probably occur where the contractor is creating access to build footings for the temporary detours and the permanent structures. The graded area around the new span would need to be a minimum distance horizontally from the structure to provide adequate vertical clearance for cranes and other equipment.

Soil and rock removal would be required up slope on the island near the tunnel portal in preparation for temporary detour and transition structures, a maintenance garage, a power substation, and construction of footings for columns on the island. Graders, backhoes, loaders, excavators, dump trucks, hoe rams, compactors, survey equipment, sieves, water trucks, concrete trucks, and cranes would be used to complete this task. For the temporary detour footings positioned on hillside areas, sheet pile and/or other temporary shoring may be used to stabilize excavated areas of slope; and cement-modified soil backfill may be used to stabilize the foundations of the transition structure.

Roadway Modifications. Several roadways on YBI would require modifications as a result of construction of the new East Span. Figure 2-20 in Appendix A depicts the existing configurations of the roadways and also shows the modifications to existing roadways (represented by shading). The modifications shown are for Replacement Alternative N-6. The other replacement alternatives would require similar roadway modifications, but the vertical and horizontal changes to the roadways would be slightly different, depending on the bridge alignment.

Macalla Road would be lowered about 1 meter (3 feet) at the intersection of Southgate Road and Macalla Road. The lowered Macalla Road would conform back to the existing grade 75 meters (246 feet) up slope and about 60 meters (197 feet) down

slope. The Macalla Road hairpin at the Southgate Road intersection would be shifted about 5 meters (16 feet) towards the inside of the curve.

Once the eastbound temporary detour is constructed, Southgate Road would be closed to public access for approximately 20 months. As a result, direct access from one side of the bridge to the other, east of the tunnel, would be eliminated during this period. Access from one side of the island to the other side would be via Hillcrest Road and Treasure Island Road. Vehicles traveling to or from San Francisco on the south side of the island would make a U-turn at the Hillcrest Road/Macalla Road intersection.

Before Southgate Road is re-opened, it would be realigned both horizontally and vertically and the lanes would be upgraded to standard width. It is expected that Southgate Road would be shifted approximately 13 meters (43 feet) east at its greatest divergence from the existing alignment, and the roadway would be lowered up to 3 meters (10 feet) from the existing roadway profile for all replacement alternatives. The modification would be made because the existing roadway is located where new columns and abutments would be placed.

In addition, construction of the eastbound temporary detour would require closure of the eastbound off-ramp and the westbound on-ramp on the east side of the YBI tunnel for approximately three years. Access to the SFOBB would continue through the use of the ramps at Hillcrest Road on the west side of the island. The intersection of Treasure Island Road and Southgate Road serves traffic exiting the bridge onto Yerba Buena Island on the east side of the tunnel. A temporary intersection would be constructed south of the existing intersection to serve this traffic and would require a temporary road through an existing slope approximately 35 meters (115 feet) south of Building 206 and Quarters 8.

In consultation with the USCG, the USCG road would be permanently realigned to avoid the columns of the new bridge. For each replacement alternative, the realigned road would be configured differently to avoid different column locations. The section of the USCG road that is roughly parallel to the existing bridge would be shifted south. A new gate and guard shack would be constructed for the realigned road. The access road from the USCG road to the parking lot would be moved from its present location northeast toward the access gate. This temporary access road would be in place for most of the construction period.

A portion of the access road to Building 262 would be modified in two phases (once to avoid the footings of the eastbound temporary detour and, ultimately, to avoid columns of the new bridge). The road would be modified for each replacement alternative but would be configured differently to avoid different column locations. While the eastbound temporary detour is in place, the road would be temporarily realigned approximately 50 meters (164 feet) south of the existing road (see Figure 2-20 in Appendix A). A portion of the access road leading to Building 262 would be permanently realigned approximately 15 meters (49 feet) to the south and would become a two-lane roadway that would conform to the existing single-lane dirt road approximately 115 meters (377 feet) from the eastern end of YBI.

Support Construction. A dock may be constructed on the north side of YBI near the Parade Grounds to facilitate the loading and offloading of material from barges and/or one other temporary barge dock would be constructed under the main span and adjoined to the eastern end of YBI near Building 262. Support facilities such as a maintenance garage and power substation would be constructed.

Construction of Temporary Detours and New Span. A summary of the staging sequence on YBI follows.

- Construction of the new bridge leading up to the eastern end of YBI;
- Construction of eastbound and westbound temporary detours;
- Redirecting westbound traffic onto the new bridge and temporary detour and eastbound traffic from the existing structure onto the temporary detour;
- Removal of the existing bridge from Bent 48 to YBI;
- Construction of the remaining section of the transition structure and eastbound on-ramp;
- Redirecting westbound and eastbound traffic from temporary detours onto new bridge;
- Dismantling the temporary detours and the remainder of the existing bridge; and
- Regrading and replanting vegetation.

The temporary detours would be operational for approximately two years. The period from the beginning of construction to the end of dismantling would be approximately four years. The detours may be removed as soon as they are no longer needed to carry traffic or they may be removed as one of the last steps of bridge construction on YBI, because the contractor may use them as platforms from which to construct other portions of the bridge.

New footings, new columns, and retrofitting and widening the East Viaduct would require drilling, forming, excavation, backfilling, driving piles or tie-downs, erecting steel, placing reinforcing steel, placing concrete, and constructing concrete forms. The majority of excavation would be conducted to provide access to construct the footings. Falsework would be constructed underneath the cast-in-place-concrete structures until those structures are self-supporting. Concrete might be mixed at a batch plant located either on the island or remotely. Trucks would deliver concrete to the site, and it would be poured or pumped into place. Cranes would be used for steel erection, lifting forms, placing reinforcing steel, and raising materials and equipment to locations on top of the structure.

For construction of Column W2 with a northern alternative, substantial excavation and bedrock removal would be necessary to reach the elevation of the footing. The exterior of the column would be concrete, and the interior of the column would consist of four pre-cast shell tubular units that would be filled with concrete. The tubular units would arrive on a barge via Clipper Cove and be lifted into place by crane. The bent cap atop this tubular unit would be a cast-in-place concrete box girder.

The columns for the transition structures would be cast-in-place concrete, and the deck would be a cast-in-place post-tensioned box girder. Pile drivers would be used to drive the steel H-piles that would be used for most of the footings.

Oakland Touchdown

Temporary Construction Easements. As is the case on YBI, the right-of-way available for staging operations would not be sufficient for constructing the new structure. Land adjacent to the Caltrans right-of-way on the south side of the existing roadway would likely be required for construction staging. While the amount of area has yet to be determined, it is likely the construction yard/easement would occupy 1-4 hectares (2.5-10 acres).

Arrival of Material and Work Crews. Access to the site would most likely be from I-80 and surface streets south of I-80, such as Burma Road. As the bridge is being built westward, the contractor may build a trestle out to the first skyway column for the delivery of materials, equipment, and work crews.

Roadway Modifications. The existing Caltrans maintenance road has been redesigned and would cross under the eastbound roadway at a point east of the existing undercrossing. This location was selected to minimize the amount and impact of fill in the Bay and yet provide enough overhead clearance for vehicles to cross under the eastbound roadway (see Figure 2-25 in Appendix A).

Construction of Temporary Detours and New Span. As the new eastbound approach and bridge structures are completed for all replacement alternatives, traffic would be re-routed from the existing structure to the new structure through the use of a temporary roadway (see Figure 2-25 in Appendix A and Section 2.6.4 — Temporary Detours on Yerba Buena Island and Oakland Touchdown Area for more detail).

Construction activities for all replacement alternatives in the Oakland Touchdown area would primarily consist of paving, traffic maintenance, excavation of buried rubble, riprap and footings, drilling, settlement control measures, removal of some existing roadways, construction of temporary access trestles, and dredging in shallow water to provide barge access to the shoreline of the western edge of the Oakland Touchdown area.

Pile driving and placement of footings in the water adjacent to the Oakland shoreline would be required to build new bridge structures. This would require the use of equipment from land, trestle, and/or barge as described above. For Replacement Alternatives N-2 and N-6, the structures would encroach into existing sand flats and eelgrass beds and land-based roadways would be constructed on imported engineered fill. For all replacement alternatives, excavation of the area would occur for the construction of footings and pile driving and would include removal of buried fill or riprap that extends east from the westbound abutment. A riprap shoreline, replacing the existing riprap, may be constructed along the edge of the new alignment near the existing shoreline where the bridge elevation is approximately 5 meters (16 feet) above MSL.

There is the potential for soil settlement in the Oakland Touchdown area because the soil/fill is underlain by soft materials. For Replacement Alternatives N-2 and N-6, wick drains and a surcharge would be used to accelerate the consolidation process of the new embankment fill, some of which would be cellular concrete. Other design considerations such as compaction may also be used to reduce the risk of unacceptable settlement. Any permanent fill placed, except for cellular concrete, would be compacted to Caltrans specifications.

For Replacement Alternatives N-2 and N-6, a portion of the westbound lanes to the east of the bridge abutment would encroach on the Bay, requiring use of engineered fill. A portion of the Caltrans maintenance road located to the west of the bridge abutment would also require use of engineered fill.

In the Bay

Arrival of Material and Work Crews. Employee and equipment access would be by boat, barge, the replacement bridge, or temporary trestle. Vessels used for delivery of workers, equipment, and materials should be able to moor at the end of the temporary docks at YBI or on trestles at the Oakland Touchdown area.

General Construction Information. Most in-water construction would take place from barges or from the decks of the skyway as it is being built outward into the Bay. Barges would be used for material delivery, dredging, drilling, pile driving, lifting, possibly concrete batch plants, and dismantling. Special barges and lifting equipment would be used to accommodate heavy equipment needed to support large-scale pile driving. In areas of shallow water, trestles could be used in conjunction with barges. It is expected that the trestles, if used, would provide five working platforms (approximately 12 meters [39 feet] in width) around columns near the Oakland Touchdown to support lighter equipment.

Dredging. Dredging would be required for portions of the Retrofit Existing Structure Alternative and each replacement alternative for barge access, foundation construction, and pile cap construction because near the Oakland shore the water depths are shallower than the draft of a standard barge. The proposed access channel for barges would be on the north side of the northern alternatives and the south side of the southern alternative. The anticipated maximum draft for the barges is 3 meters (10 feet), but to ensure adequate clearance over potential irregularities in channel depth, barge ""listing during heavy lifting, and to allow for some potential resettlement of materials in the channel after dredging, the channels would be dredged to a depth of 3.6 meters (12 feet) adjacent to the Oakland Touchdown and 4.3 meters (14 feet) for the rest of the channel. Dredging to a depth of 4.3 meters (14 feet) would also be required northeast of the USCG facility on YBI for Replacement Alternative S-4. Barge anchor lines would be moved into position from smaller boats as opposed to the primary barge(s) to prevent the dragging of anchors into position, and barge anchor lines would be kept taut as the tide and levels change in order to minimize contact between the lines and the Bay bottom.

Section 4.14.10 — Temporary Impacts, Construction Excavation, and Dredging discusses dredging and options for disposal of dredged materials in more detail.

Estimated dredged quantities for the build alternatives are presented in Table 4.14-4. Figures 2-21 and 2-22 (in Appendix A) illustrate the potential barge access channel configurations denoted by the dredging limits at the Oakland Touchdown and YBI.

Structure Construction. The substructure (below the tops of the columns) would consist of columns, foundations, piles, pile caps, anchoring systems, fenders, navigation electrical systems, and possibly a corrosion monitoring system. Substructure construction would consist primarily of installation of columns, piles, and pile caps. It is expected that cofferdams would be constructed to build columns in shallow water near the Oakland Touchdown, and cast-in-steel shell piles would be driven to serve as the foundation to the permanent columns. Where piles are driven, mud within the piles would be removed and replaced with concrete placed by pump. The removed mud would be beneficially reused or disposed of off-site. Construction of columns adjacent to YBI, including the main span tower, would require Bay bottom rock removal to secure the tower foundation. Excavation would occur to remove loose rock, which would be disposed of off-site at an upland location. Shafts would then be drilled through the bedrock down to and into the load-bearing strata and piles would be driven into the shafts. Construction of the main span tower and columns would require large-scale construction equipment, including cranes, barges, dredges, drill rigs, concrete batchers, and concrete pumps. Pile drivers and drills would be mounted on deep-draft barges to drive large-diameter piles as required.

The superstructure (the portion of the bridge above the top of the columns) would be primarily constructed of steel and concrete and would consist of girders, cable elements, the deck, deck joints, barriers, bearings, lighting, and signing. Many of these items would be pre-cast or fabricated off-site then transported to the site and lifted from barges using floating and tower cranes. For a portion of the main span, the superstructure would be delivered to YBI, set on the shore and lifted with land cranes. Barge-mounted concrete batch plants may also be used to pump concrete into forms suspended over water for the bridge deck at both the east and west ends of the project. A temporary structure would be built from YBI east into the Bay to support the main span while the permanent bridge deck and main tower are constructed. Temporary columns may be placed in the Bay or on either side of the permanent main tower. Temporary trestles may be constructed from the Oakland Touchdown westward.

Once portions of the new structure are constructed, they could be used as working platforms for other construction activities. Construction activities taking place from the new structure could include delivery of materials and equipment and lifting and positioning of structural components.

For construction of the main tower, Bay bottom sediments would be removed, holes would be drilled into bedrock, and hollow steel piles would be driven or socketed into the holes. A prefabricated steel box pile cap would be floated into position and sunk onto them, sealed around the piles, and pumped dry. The pipe piles and pile cap would be filled with reinforced concrete and steel creating a surface on which four prefabricated tower legs would be erected. The legs would be raised by cranes and bolted together by link beams.

For the main span, prefabricated steel deck segments would be transported to the site by barges, raised by crane, and placed on falsework. Each newly elevated segment would be slid forward on the falsework and connected to the previously installed segment. After the cables and suspenders are anchored to the deck, the falsework would be removed and utilities would be installed.

Construction of the skyway piles would be similar to that of the main tower. The piles would be driven into the Young Bay Mud, a prefabricated steel box pile cap would be floated into position and sunk onto the piles, sealed around them, and then pumped dry. Precast concrete fenders would be brought to the site and attached to the pile cap. The pipe piles and then the pile cap would be filled with reinforced concrete, creating a surface on which the columns can be founded.

Bridge Closures. Caltrans is continuing to investigate lane and bridge closures to transition traffic from the existing bridge to the temporary detours and to a replacement bridge. Caltrans would plan the closures in an effort to simultaneously minimize public inconvenience, facilitate construction, and maximize public safety. The closures would be scheduled to occur during off-peak hours to the maximum extent feasible. Caltrans would implement a Traffic Management Plan to manage impacts to traffic.

2.6.3 Dismantling the Existing SFOBB East Span

Dismantling the existing SFOBB East Span would be required to provide land connections to the new span for replacement alternatives at YBI and the Oakland Touchdown area. USCG also requires removal of the entire existing bridge for the safety of marine traffic once a replacement bridge is constructed. The Coast Guard Bridge Administration Manual, Commandant Instruction M16590.5A, requires "that any part of bridges which are replaced (except those parts incorporated into the new bridge) be removed down to the natural bottom of the waterway..." (See U.S. Coast Guard [USCG] letter dated August 12, 1998, in Appendix G.) The USCG currently plans to require that existing bridge piers and temporary pier piles be removed to an elevation of at least 0.46 meter (1.5 feet) below the mudline, to be measured at the time of removal.

The existing bridge, access trestles, temporary falsework, and temporary detours would be removed under the replacement alternatives. The methods of removal selected by the contractor would comply with all dismantling guidelines of the following required permits: Section 401 of the Clean Water Act, a National Pollutant Discharge Elimination System (NPDES) permit, an ACOE permit pursuant to Section 10 of the Rivers and Harbors Act, a USCG permit pursuant to the General Bridge Act of 1946 and a Bay Conservation and Development Commission (BCDC) Major Permit.

Removal would be conducted in such a manner that the portion of the structure not yet removed remains in a stable condition at all times.

There are two primary physical constraints affecting the dismantling task. First is the proximity of the replacement alternatives to the existing spans, which would necessitate

performing most marine activities from one side. Second, the shallow water depths beneath the spans as they approach the Oakland Touchdown area would require using shallow-draft barges or dredging along one side and underneath for deeper draft barge access.

Dismantling activities would consist of seven major stages, which represent major components of the bridge (see Figure 2-15 in Appendix A):

- YBI Viaduct;
- YBI 88-meter (288-foot) steel truss approach spans;
- Oakland shore;
- YBI temporary detours;
- Cantilever truss spans;
- 155-meter (509-foot) steel truss spans; and
- 88-meter (288-foot) steel truss spans.

The YBI viaduct, the YBI shallow truss approach spans, the Oakland shore section, and the YBI temporary detours would be dismantled during construction of a replacement alternative because of construction staging. The three other sections would be dismantled under separate contracts.

Dredging. Some areas near the Oakland Touchdown are too shallow to accommodate the large barges needed to complete the dismantling process; thus, an access channel would need to be dredged. Once the superstructure is removed, the bridge foundations would be removed to an elevation of at least 0.46 meter (1.5 feet) below the mudline. This would require the excavation of sediments around the footings using cofferdams and techniques such as reverse circulation drilling, jetting, and air lifting to remove the material around the footings. These methods involve creating a slurry of material within the cofferdam and lifting or pumping it into the drilling vessel or barge. The material may also be removed by mechanical clamshell excavation; however, dustpans and sidecasters would not be permitted. Access dredging for dismantling and sediment reuse/disposal options are described in Section 4.14.10 — Temporary Impacts, Construction Excavation, and Dredging and the Dredged Materials Management Plan (DMMP) (see Appendix M).

Superstructure

Removal of deck structures could be performed by cutting them into pieces or by disassembling them panel by panel. Steel truss spans over the water near the Oakland shore cannot be removed by conventional barge and crane methods due to the shallow water and low clearance under the deck. A possible option is to construct temporary supports under the span and disassemble the truss segment by segment. Other possible methods to remove the steel trusses include dredging for barge clearance, constructing access embankments of temporary engineered fill, or using special shallow-draft barges or rigging devices for lowering sections onto barges from the bridge deck. Protective measures would be taken to prevent materials or debris from falling into the Bay. Depending on location, materials could be removed by barge or truck to a predetermined site for reuse, recycling, or disposal. Depending on methods used by the contractor, the temporary detours on YBI (described in Section

2.6.4 — Temporary Detours on Yerba Buena Island and Oakland Touchdown Area) could be designed for simple erection and disassembly with relatively light equipment. Access dredging for dismantling and sediment reuse/disposal options are described in the DMMP (see Appendix M).

Substructure

Large structural elements could be lifted from their bases in one piece or piece by piece. Dismantling of the concrete foundations at the columns would require reducing the reinforced concrete to pieces that are small enough to be hauled away. This could be done by mechanical means such as saw cutting, flame cutting, mechanical splitting, or pulverizing and hydro-cutting. According to ACOE and BCDC, another acceptable method of disposal would be to use the hollow interiors of the columns remaining below the mudline as receptacles for pieces of concrete. As the upper portion of the column is dismantled, pieces of concrete could fall into the hollow interiors below the mudline. When the portion of the column above the mudline is completely removed, the column remaining below the mudline could be capped or would gradually fill in through siltation. Removal of the columns to 0.46 meter (1.5 feet) below the mudline could be done by an underwater dismantling method or by constructing cofferdams at each column. The cofferdam method includes construction of a cofferdam around the column, pumping the water out, and removal of concrete with jackhammers, concrete saws, drills, corers, and cranes to lift the debris out. Depending on methods used by the contractor, cofferdams may or may not be used for columns adjacent to YBI and the Oakland Touchdown. Use of cofferdams is assumed for purposes of estimating dredge disposal quantities generated by existing bridge removal (see Table 4.14-4). Any reinforcing steel would be cut off to remain flush with the face of the concrete that remains below the mudline.

2.6.4 Temporary Detours on Yerba Buena Island and Oakland Touchdown Area

Temporary detours are designed to reroute traffic around the existing structure on YBI and at the Oakland Touchdown area.

Several temporary detour options were considered for YBI and evaluated based on construction feasibility, impacts to YBI resources, construction schedule impacts, traveler and worker safety, and traffic operational impacts. It was determined that the preferred option for temporary detours would be a north-south detour option. This option is discussed below. Other options considered and withdrawn are presented in Section 2.7.10 — Temporary Detours.

Yerba Buena Island

On YBI, the temporary detours would route traffic around the construction area while portions of the existing East Span are demolished and new transition structures are completed where the existing bridge now stands. The temporary detours would allow the replacement structures to be connected to the retrofitted YBI East Viaduct while minimizing impacts to traffic.

Replacement Alternatives N-2 and N-6, North-South Temporary Detour Options. Replacement Alternatives N-2 and N-6 temporary detour options are located entirely on land and range in length from 480 meters (1,574 feet) to 580 meters (1,902 feet).

The westbound temporary detour would be constructed north of the YBI transition structure and existing East Span. Westbound traffic would be routed from the new westbound bridge structure onto the temporary detour, to the existing viaduct, then to the existing YBI tunnel. The eastbound temporary detour would be constructed south of the transition structure and existing bridge (see Figures 2-16.2 and 2-17.2 in Appendix A). Eastbound traffic would exit the tunnel onto the eastbound temporary detour and connect to the lower deck of the modified existing bridge which would continue to carry eastbound traffic during construction. In order to allow for eastbound traffic to travel from under the existing westbound (upper) deck, a cast-in-place concrete portal frame would be constructed to support the south edge of the westbound deck. When the load is being transferred from the support columns to the portal frame, the eastbound and westbound traffic lanes would be fully closed, allowing for removal of the columns.

Replacement Alternative S-4 North-South Temporary Detour Option. Replacement Alternative S-4 temporary detour would range in length from 400 meters (1,312 feet) to 450 meters (1,476 feet).

Replacement Alternative S-4, north-south temporary detour, would require placing three temporary columns immediately offshore from YBI. The westbound temporary detour would be constructed north of the transition structure and existing bridge. Westbound traffic would be routed from the existing viaduct to the temporary detour, then back onto the existing East Span before the tunnel. The eastbound structure would be placed south of the transition structure and existing East Span (see Figure 2-18 in Appendix A). Eastbound traffic would exit the tunnel, transfer to the eastbound temporary detour, and connect to the new eastbound bridge.

Oakland Touchdown Area

Temporary detours would be built on engineered fill on existing land. Temporary construction easements would be required where the temporary detour limits extend beyond the existing rights-of-way.

Temporary detour roadways at the Oakland Touchdown area would be similar for the northern replacement alternatives. The eastbound temporary detour roadway would be constructed to the south of the existing eastbound lanes, requiring relocation of the existing Caltrans maintenance road and use of Port of Oakland land. Temporary roadways would not be required for construction of the westbound approach and structures. Construction sequencing would begin with the construction of the westbound approach roadway and rerouting westbound traffic from the existing westbound approach onto the new westbound structure. Following construction of the eastbound approach and structure, eastbound traffic would shift from the temporary detour onto the new structure, and the Caltrans maintenance road would be realigned.

Under Replacement Alternative S-4, traffic would remain on the existing East Span until completion of the new westbound and eastbound structures. Once the eastbound structure is completed, eastbound traffic would be diverted from the existing bridge to the new eastbound structure and onto a temporary detour roadway on existing Port of Oakland land south of the proposed structure. Westbound traffic would remain on the existing structure until construction is completed for the westbound structure and approach. On completion of the westbound bridge approaches, roughly between stations 87 and 89 on Figures 2-11.4 and 2-11.5 (Appendix A), westbound traffic would be diverted to the new westbound structure.

2.7 ALTERNATIVES CONSIDERED AND WITHDRAWN

In addition to the alternatives and project features described above, Caltrans considered a range of other project alternatives and features prior to the DEIS which were ultimately withdrawn from further consideration for a variety of reasons. These alternatives (shown on Figure 2-19 in Appendix A) and features are described below, along with the reasons for their withdrawal.

2.7.1 Replacement Alternative N-1

Replacement Alternative N-1 is a 3,685-meter (12,087-foot) long replacement alignment located to the north of Replacement Alternative N-6. Eastward from the YBI tunnel, this alternative would transition from a double-deck viaduct to two parallel structures. The alternative meets project design criteria and accommodates a main span cable-stayed, self-anchored suspension, or skyway design option. A bicycle/pedestrian path could be constructed as part of Replacement Alternative N-1. At the transition structure over YBI, the bridge would split from a double-deck structure to two parallel single-deck structures.

Replacement Alternative N-1 was defined, in part, to respond to recommendations from the MTC EDAP calling for an alternative that arched northward to maximize San Francisco skyline views for westbound bridge users and panoramic East Bay Hills and Oakland skyline views for eastbound users.

Replacement Alternative N-1 was defined as the northernmost alignment capable of providing skyline views while minimizing intrusion into Bay bottom geologic zones associated with the ancient Temescal Creek bed. This geologic zone contains deep mud layers. However, based on geologic data obtained after setting the alignment for Replacement Alternative N-1, it was determined that approximately one-half of it would fall within areas of deep Young Bay Mud, increasing the complexity, schedule, and cost of constructing the bridge substructure.

Although Replacement Alternative N-1 could be designed to maintain a lifeline vehicular connection in the event of an MCE, construction of the alternative would increase construction schedule and cost without providing substantially enhanced panoramic views when compared to other northern alternatives. Replacement Alternative N-1 was withdrawn from further consideration, and additional northern

alternatives were analyzed for their ability to maximize user views while avoiding undesirable Bay bottom geologic zones.

2.7.2 Replacement Alternative N-3

This alternative, along with Replacement Alternatives N-4 and N-5, was defined through further refinements of northern alternatives. Studies were directed to meeting operational and safety design standards to the greatest extent possible, while placing the tower for the cable-stayed or self-anchored suspension design variations close to YBI, where geologic conditions are most favorable for the positioning of the tower footing that would, in turn, allow the main span to be positioned over the main navigation opening.

Replacement Alternative N-3 would place the main span tower approximately 110 meters (360 feet) offshore from YBI where distance to rock is approximately 20 meters (65 feet) with limited overlay of Young Bay Mud. Location of the tower at this site would facilitate construction schedule by reducing the amount of Bay excavation required.

Although tower placement would be optimized under Replacement Alternative N-3, the tower location would require the roadway horizontal and vertical alignments to be modified to less than optimum configurations, resulting in restricted sight distances which would affect driver response and, ultimately, roadway safety. The distance between the east YBI tunnel portal and the tower would require the westbound alignment to begin a northward curve immediately upon exiting the tunnel, resulting in restricted sight distance for westbound drivers approaching the tunnel portal. Roadway superelevation, the angle of tilt on a horizontal curve, would be limited to one percent. These design conditions would not meet American Association of State Highway and Transportation Officials (AASHTO) current design standards, requiring application for a mandatory design exception. A design exception would also be required because the westbound on-ramp from YBI would have inadequate sight distance. Replacement Alternative N-3 would also require using asphalt to build the height of the lanes on the upper deck of the YBI East Viaduct to connect to the new structure. Based on the inability of the Replacement Alternative N-3 to meet operational and safety design standards to the same extent as alternatives carried forward, it was withdrawn from further consideration.

2.7.3 Replacement Alternative N-4

Replacement Alternative N-4 was identified through refinement of northern alternatives. Replacement Alternative N-4 would place the main span tower 120 meters (394 feet) from YBI in the main navigation opening. The alignment would be south of Replacement Alternative N-1, minimizing intrusion into undesirable Bay bottom geologic zones.

Replacement Alternative N-4 was a modification of Replacement Alternative N-3 which provided for a 180-meter (591-foot) tangent (straight) roadway section at the YBI tunnel approach on the westbound alignment. This alternative was defined to prevent westbound traffic entering the tunnel portal on a curve. Replacement Alternative N-4

would meet the minimum roadway geometric operational and safety design standards. Overlay of the existing YBI East Viaduct upper deck roadway would be required to conform with the new westbound structure.

Although Replacement Alternative N-4 met minimal operational and safety design standards, geometric requirements would push the main span tower location further into the main navigation opening where distance to rock and depth of Young Bay Mud increased significantly compared to Replacement Alternative N-3. The increased depth to the main span tower would increase project cost and extend the construction schedule. Based on the deep water tower location, Replacement Alternative N-4 was withdrawn from further consideration, and alternative refinement studies were advanced.

2.7.4 Replacement Alternative N-5

Replacement Alternative N-5 represented a continuation of northern alternative refinement studies. Replacement Alternative N-5 would place the main span tower 158 meters (518 feet) offshore from YBI. Compared to the alignments for Replacement Alternatives N-3 and N-4, Replacement Alternative N-5 consisted of a 6,000-meter (19,685-foot) radius curve on the westbound alignment. As with Replacement Alternative N-3, the westbound alignment would enter the YBI tunnel portal on a curve, although the large curve radius would reduce or eliminate sight-distance concerns associated with Replacement Alternative N-3. Replacement Alternative N-5 would increase the rate of superelevation to two percent, which meets minimum design standards. Elevating the deck of the existing YBI East Viaduct would be required to conform to the new westbound structure.

Based on the desire to place a tangent roadway section at the westbound alignment approach to the YBI tunnel portal and the need to place and maintain the main span tower as close to YBI as possible, Replacement Alternative N-5 was withdrawn from consideration in favor of Replacement Alternative N-6.

2.7.5 Replacement Alternative S-1

Replacement Alternative S-1 was developed to minimize the length of the new bridge by providing a tangent directed toward the Oakland shore. As such, it would enter and exit the YBI East Viaduct similar to the existing alignment, eliminating the alignment curves that would provide panoramic vistas of the East Bay hills and the San Francisco skyline. The length of the bridge would be 3,525 meters (11,562 feet).

Replacement Alternative S-1 and other southern alternatives were proposed to reduce impacts to redevelopment concepts planned on YBI by the City and County of San Francisco (CCSF). Draft land use redevelopment scenarios would be affected by all replacement alternatives; however, southern replacement alternatives would use areas of YBI with more limited redevelopment potential for CCSF.

Replacement Alternative S-1 would align the replacement structure parallel and to the south of the existing East Span. This alternative would affect the East Bay Municipal

Utility District (EBMUD) sewer outfall that is aligned south of the existing SFOBB. The outfall is approximately 85 meters (280 feet) south of the existing bridge at its eastern end and 219 meters (720 feet) to the south at its western end (see Figure 2-19 in Appendix A). The offshore portion of the pipeline is approximately 1,600 meters (1 mile) long. This 2.44-meter (8-foot) diameter outfall pipe disperses treated effluent from the EBMUD main wastewater treatment facility located immediately to the east of the project area. The outfall and a dechlorination facility located on the Oakland Touchdown area are critical elements to the operation of the EBMUD main wastewater treatment plant.

EBMUD reviewed proposed Replacement Alternative S-1 and expressed concern that the construction of the replacement bridge structures and the transverse crossing of the outfall in the Bay could cause both short- and long-term damage to the facility and increase complexity of maintenance activities. The outfall facility is 50 years old and construction activities, such as pile driving and dredging, may affect the structural integrity of the pipeline. The outfall would be at risk of damage or ruptures that could cause the release of secondarily treated effluent into the Bay. If this were to occur, EBMUD could be held in violation of its National Pollutant Discharge Elimination System (NPDES) Permit and could incur substantial monetary fines levied by the San Francisco Regional Water Quality Control Board (RWQCB). As a result, EBMUD determined that relocation of the outfall and dechlorination facility would be required to avoid potential conflicts or incidents.

In response to consultation with EBMUD, Replacement Alternative S-1 was revisited. By reducing the horizontal curve radius of the structures adjacent to YBI, Replacement Alternative S-1 was modified to more closely parallel the existing East Span at the approach to the Oakland Touchdown area. The revisited Replacement Alternative S-1 would eliminate a transverse, crossing in the Bay of the EBMUD outfall structure by setting the alignment between the existing East Span and the outfall pipe. Although no direct alignment conflict with the outfall structure would occur, concern remained for construction-period impacts to the outfall. The potential for damage to the outfall during construction could involve additional environmental permitting, thereby causing schedule delays, and during a seismic event, potential for damage to the outfall and bridge structures would be increased due to the proximity of them. Further investigation revealed that proposed replacement bridge construction methods would require dredging for barge access that could not be accomplished within the area between the existing bridge and the outfall structure.

Based on the potential conflicts with the EBMUD sewer outfall, Replacement Alternative S-1 and revisited Replacement Alternative S-1 were withdrawn from consideration in the DEIS in favor of a southern alternative that minimized potential conflict with the outfall structure.

The City and County of San Francisco Modified S-1 Alternative

In a comment letter on the DEIS (see the City and County of San Francisco Planning Department letter dated November 23, 1998 in Volume II of this FEIS), the CCSF presented a southern alternative (referred to in this FEIS as the CCSF Modified S-1 Alternative). Under this alternative, the new bridge would be located south of the

existing structure and designed to minimize bridge length between YBI and Oakland (like the previously withdrawn Replacement Alternative S-1). The CCSF Modified S-1 Alternative would consist of two parallel structures similar to those proposed for the replacement alternatives. This 3,450-meter (11,320-foot) long structure would provide a straight connection from YBI to Oakland, moving away from the TI/YBI developable land to the north with a single curve for each roadway at YBI.

The columns supporting the eastbound roadway where it crosses the EBMUD outfall pipe would straddle the structure with outrigger "frame" supports and provide an opening through the foundation pilings for the outfall pipe.

Further Study of Relocating or Straddling the Outfall

Since publication of the DEIS, relocation and straddling options for the outfall were further evaluated to determine the feasibility of the CCSF Modified S-1 Alternative. Because this alternative was withdrawn from consideration prior to the circulation of the DEIS, a supplemental DEIS was not warranted for this additional analysis. At the request of FHWA and the Navy, ACOE examined the feasibility of the CCSF Modified S-1 Alternative. ACOE reviewed reports, backup data, and analyses provided by Caltrans, CCSF, consultants, and EBMUD to provide an independent assessment of the risks, costs, complications, and schedule issues associated with constructing the bridge along the CCSF Modified S-1 Alternative alignment. In January 2000, ACOE compiled the results of its review in a report entitled "Assessment of the San Francisco-Oakland Bay Bridge Seismic Replacement Project's Impact on the EBMUD Sewer Outfall."

Options. In addition to an option where bridge foundations are designed to straddle the outfall pipe, three outfall relocation options were examined: trench relocation, use of a tunnel, and partial relocation.

The trench relocation option would relocate the entire sewer outfall to the north with a crossover pipe connected to the onshore pipeline. For the pipe to be founded in dense sands, the bottom of the offshore pipe would have to be located at approximately 20 meters (66 feet) below MSL. In areas where the sand layer is deeper, sub-excavation of the soft sediments would have to be done to as deep as 25 meters (82 feet) below MSL and backfilled.

A tunnel option would also relocate the entire outfall to the north of its current position. This option was evaluated because relocating the outfall to the north of the alignment reduced the potential for damage to the outfall during construction or a seismic event. As a result, there were fewer issues to address in the environmental documentation and permitting processes, which would prevent schedule delays. In addition, the tunnel option could increase the design life of the outfall to over 100 years because the tunnel would be located within the stiff clay/dense sand layer below Young Bay Mud at approximately 30 meters (98 feet) below MSL. This location would also reduce the potential for damage to the bridge resulting from a shift of the outfall during a seismic event.

The partial relocation option, which was developed to minimize impacts from Replacement Alternative S-4, includes relocating a portion of the onshore pipeline. Under this option, the alignment would avoid the offshore portion of the pipeline, but would cross over the onshore portion of the pipeline just east of the dechlorination facility. This crossing may create the possibility for damage to the outfall during construction activities. The dechlorination facility would not be displaced. The CCSF Modified S-1 Alternative would cause the entire offshore sewer pipeline to be relocated to avoid major impacts to the design and construction of the bridge. The partial relocation option would not be applicable to the CCSF Modified S-1 Alternative because it would result in the relocation of the entire offshore portion of the outfall.

Costs. Straddling the outfall would require significant modifications to the structural and foundation design of the new bridge, special and costly pipeline protective measures, and innovative foundation installation. Due to numerous uncertainties in regard to these issues, the cost of the straddling option is difficult to estimate without conducting a detailed design study.

Based solely on existing estimates of construction costs, the tunnel option would cost $87 million, the trench relocation option would cost $72 million, and the partial relocation option would cost $17 million. In addition to the construction costs, other incremental costs range from $43 to $77 million and are identified below.

It is estimated that additional study costs would range from $1.8 to $3.8 million and include land and marine outfall surveys, geotechnical studies of outfall foundation, bedding material, and surrounding geology, seismic analysis to model interaction between outfall and the new bridge foundation, and condition assessment for the outfall before and after construction. Additional design and construction costs are estimated to range from $19.0 to $36.5 million. Secondary construction costs (e.g., cost of implementing a monitoring program, demolishing the Key Pier Substation, and relocating the maintenance access road) range from $17.1 to $28.2 million. Post-construction costs range from $5.5 to $8.3 million and include a post-construction condition assessment of the outfall and future operations and maintenance costs. The ACOE, at the conclusion of the independent review of the outfall crossing report, stated that construction costs would likely constitute nearly half of the incremental costs, but it is difficult to verify the magnitude of these costs because the highest itemized cost estimate reflects restrictions related to seasonal breeding and migration of wildlife that may not materialize. The ACOE, in summarizing its independent review, stated that a more defensible overall estimate was $35 to $70 million. Costs for possible outfall damage range from $14.5 to $24 million and include increased risk associated with handling and placement of piles, construction and columns of superstructure, construction of trestles, and access dredging.

These incremental costs do not include possible costs arising from daily fines for any National Pollutant Discharge Elimination System (NPDES) permit violations.

Advantages/Disadvantages. The straddling option would involve several construction challenges and future access to the outfall for maintenance and repairs

would be more difficult due to the close proximity of new bridge columns and abutments.

Each of the outfall relocation options has distinct advantages and disadvantages when compared to the others.

Costs would strongly favor the partial relocation option, but this could only be implemented with Replacement Alternative S-4.

The trench relocation option's advantages are a new offshore pipeline and a location for the outfall that would be clear of SFOBB southern alternatives. This is EBMUD's preferred option. The disadvantages are higher costs, greater disruption to sensitive San Francisco Bay waters, and delays in project schedule of 3-5 years. These delays, which would also apply to the tunnel option, would result from preparation of a design, completion of the environmental review process, acquiring permits as necessary from BCDC, ACOE, National Marine Fisheries Service (NMFS), California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service (USFWS), and RWQCB, building the new outfall, and removing the existing outfall.

The tunnel option advantages are also a new offshore pipeline, a design life that is at least twice as long as the trench relocation option due to greater protection of the pipeline from seismic events and offshore hazards, fewer impacts to the Bay environment, and fewer schedule extensions due to reduced permitting. The disadvantages are higher costs, restricted access for maintenance of the pipe, and the delays of 3-5 years mentioned above.

Further schedule delays for all relocation options are likely to occur as a result of the negotiation process with EBMUD, which has requested indemnification in perpetuity. It is difficult to quantify how long negotiations would take. Also, if the integrity of the outfall becomes compromised during construction, it is likely that there may be construction delays while response measures are developed and implemented. Actual damage to the outfall leading to a violation of the NPDES permit may result in a shutdown of the entire bridge construction project while repairs take place.

The environmental review process mentioned above would involve production of a supplemental Environmental Impact Statement (SEIS) for all options to assess the likelihood of damage to the outfall during or after construction. The SEIS would be used to develop the appropriate response measures for potential sewage spills caused by outfall blockage and a resulting treatment plant failure.

Other Issues Related to a S-1 Alternative

In addition to the impacts to the EBMUD outfall, there are several other issues associated with the CCSF Modified S-1 Alternative.

Section 4(f) Use. The Oakland Army Base Reuse Authority (OBRA) Reuse Plan has designated 5.9 hectares (14.7 acres) at the westernmost portion of the former Army Base on the Oakland Touchdown as the site of a proposed public access shoreline park. The proposed Gateway Park has received the support of interested local,

regional, state, and federal agencies. The EBRPD has taken the responsibility for being the lead agency to further plan and manage the park. The Gateway Park is a Section 4(f) resource pursuant to the Transportation Act of 1966 and, as such, receives protections from use by transportation projects.

The CCSF Modified S-1 Alternative would bisect the parcel of designated parkland and would reduce the size of the proposed park by approximately one-half. This alternative would use much of the westernmost end of the park property, where views of the Bay to the south and west are the most dramatic and where the presence of a park would most effectively enhance the experience of landfall for bridge users and for park visitors. The bridge structure would also be immediately adjacent to the remaining parkland, thereby increasing expected noise levels in the park. A southern alternative would result in a Section 4(f) use of the proposed park.

Besides using a Section 4(f) protected parkland, the CCSF Modified S-1 Alternative would cross directly above the historic Key Pier Substation, which is also protected by the provisions of Section 4(f). The alignment would either span the building or would require its dismantling. Dismantling would constitute a Section 4(f) use.

Main Span Tower Construction Complexity. Founding the main span tower in bedrock would be more cost and time efficient than founding it in Young Bay Mud. The tower for all southern alternatives would have to be constructed approximately 67 to 71 meters (220 to 233 feet) below the mudline to be founded on bedrock. As a comparison, under Replacement Alternative N-6, the distance to the bedrock ridge is 6 to 9 meters (20 to 30 feet) below the mudline, and under Replacement Alternative N-2, the distance to bedrock is 11 to 14 meters (36 to 46 feet) below the mudline. Underwater construction increases in difficulty and cost with greater water depth. Safety requirements are also substantially increased, which could affect project schedule and cost. Depending on maximum construction depths, specialized equipment may be needed.

Visual/Aesthetics. Aesthetically, a northern alternative provides for a greater range of views for bridge users. Southern alternatives do not provide panoramic vistas of the East Bay hills and the San Francisco skyline to the extent that the northern alternatives do.

Conclusion

Replacement Alternative S-1, revisited Replacement Alternative S-1, and the CCSF Modified S-1 Alternative were withdrawn from consideration because construction of other southern alternatives that do not conflict with the EBMUD outfall are less likely to cause schedule delays (an estimated 8-15 months minimum), cost increases in the millions of dollars, increased risk of environmental damage resulting from effluent release, and complexity of long-term maintenance.

2.7.6 Replacement Alternative S-2

Replacement Alternative S-2 represents a continuation of southern alternative studies. Replacement Alternative S-2 provided broader radius curves at the YBI transition

areas, avoiding the need for design exceptions. In response to geometric constraints, the distance to rock suitable for tower footings would also be in excess of 61 meters (200 feet) below the mudline.

Construction staging to maintain five lanes of traffic in each direction would require construction of temporary detours eastward to the cantilever section of the existing East Span. Further investigation indicated that tie-in of the temporary detours to the cantilever section would be complex and could potentially compromise the structural integrity of the existing structure.

Replacement Alternative S-2 would avoid a transverse crossing of the EBMUD sewer outfall in the Bay.

Although Replacement Alternative S-2 would meet mandatory design standards at YBI and would avoid impacts to the EBMUD sewer outfall, it was withdrawn from further consideration due to concerns for the structural integrity of the existing cantilever section raised by connection of temporary detours.

2.7.7 Replacement Alternative S-3

Replacement Alternative S-3 represents a southern alignment design refinement to better address operational and safety geometric design standards in the YBI transition area. Replacement Alternative S-3 was set at the YBI approach to eliminate the need for design exceptions for superelevation of roadway curves. However, meeting geometric standards would move the main span tower away from YBI to a location where distance to rock suitable for tower footings would be in excess of 61 meters (200 feet). As explained under the CCSF Modified S-1 Alternative, the difficulty, cost, and safety of underwater construction increases with water depth. Specialized equipment may be required. And similar to Replacement Alternative S-1, Replacement Alternative S-3 would not provide bridge users with panoramic views.

Replacement Alternative S-3 would require construction of temporary detours similar to those described for Replacement Alternative S-2. This raised concerns for the structural integrity of the existing East Span cantilever span during construction.

Replacement Alternative S-3 would have impacts to the EBMUD outfall structure similar to those described for Replacement Alternative S-1.

Based on the inability to meet mandatory design standards for superelevation, constructibility issues for tie-in of temporary detours to the existing East Span, and impacts to the EBMUD sewer outfall, the Replacement Alternative S-3 was withdrawn from further consideration.

2.7.8 Double-deck Alternative

A double-deck replacement bridge was considered early in the evaluation of replacement alternatives. The double-deck alternative could be constructed on either

northern or southern alignments. It would provide five vehicular traffic lanes in each direction and inside and outside shoulders.

Preliminary cost estimates, prepared by Caltrans in 1996, indicated the double-deck replacement alternative would be more expensive than the single-deck alternatives.

A double-deck structure would limit views for lower-level bridge users. Lower deck views would be restricted by the upper deck roadway and supports as they are on the existing bridge.

Concerns for seismic reliability of double-deck structures have been raised because of extensive damage suffered by existing double-decked structures in recent seismic events, particularly Loma Prieta earthquake damage to the existing overhead truss section of the Bay Bridge East Span. It was determined that a seismically reliable double-deck replacement alternative could be designed. One method would be to construct an upper deck supported by columns straddling an independently supported lower structure. The resulting bridge substructure would be similar in mass to columns and footings for parallel structures.

Based on concerns over interaction of two structures in such close proximity during seismic events and the inability of the double-deck structure to provide panoramic views, the double-deck replacement alternative was withdrawn from further consideration.

2.7.9 Design Variations Considered

Profile

Replacement alternative refinement studies evaluated options for the bridge profile, which is the rise in roadway elevation from the Oakland Touchdown area to the YBI East Viaduct connection. Three profile variations—level approach grade, constant grade, and elevated grade—were evaluated.

Level Approach Grade profile refers to a vertical alignment that would remain level and near the water surface from the Oakland Touchdown area and begin elevation rise as far west as possible to provide required navigation clearance of 41 meters (135 feet) and conform to the existing YBI East Viaduct. A main span cable-supported design variation would be on such a grade.

Constant Grade indicates a vertical alignment rising at a consistent grade from the Oakland Touchdown area to meet main navigation opening clearance requirements and conform at YBI. A main span cable-supported design variation would be on a constant grade. The skyway of a cable-supported design variation would be on a constant grade until leveling on the main span where the cable-supported portion of the bridge adjoins the skyway portion of the bridge.

Elevated grade modifies the constant grade design variation rise at a slightly elevated grade between the Oakland Touchdown area and the main span. A main span cable-supported design variation would be level.

Traffic operational characteristics of each profile variation were evaluated with emphasis on the effect of roadway grade on truck speeds climbing the westbound grade. The analysis concluded that the range of a truck climbing speed difference among the three design variations was approximately six seconds and was not a substantial differentiation among the options[9].

Because no operational benefits would result from any of the profile design variations, it was not necessary to carry profile design variations to further levels of design refinement. The aesthetic impacts of profile variations were evaluated because the profile defines the line that the structures would draw across the horizon. Minor differences in the three design variations would be perceived from most views. At EDAP public meetings, a general preference was stated for the elevated grade profile design variation, because cable-supported main span design variations would have a symmetrical appearance from distant views and would contribute to bridge users' experience of passing through a portal.

There was no support for the level approach grade because it would have the appearance of the San Mateo Bridge, which, although functional and cost-effective, is considered to be inappropriate for the character sought for the East Span replacement structure.[10] It was withdrawn from further consideration. Caltrans performed a value analysis that resulted in substantial cost savings by lowering the profile at the main span tower to a position that was similar to the constant grade variation and acceptable to the overall bridge architecture. Additionally, with the inclusion of a bicycle/pedestrian path constructed at the same grade as the bridge, the constant grade rather than the elevated grade would produce slightly slower downhill speeds for bicyclists and result in improved safety. The elevated profile was considered but withdrawn for structural, economic, and marginally improved bicycle/pedestrian safety reasons.

Main Span Tower Design Variations

Cable-supported main span design variations were refined under the guidance of the EDAP. Progress designs up to the 30-percent design level for a representative replacement (Replacement Alternative N-6) were developed by two independent teams of structural engineers and architects. Extensive public participation and feedback were sought as part of the EDAP review of cable-supported design variations.

Designs for main span towers presented to the EDAP included a single tower between the parallel roadways and two "portal" towers with interconnected parallel towers arching over each structure. Portal towers considered included "H"-shaped and arched towers through which suspended roadway structures would pass. Single- and dual-tower design variations were created for both the cable-stayed and self-anchored suspension design variations.

[9] SFOBB East Span Retrofit Project Profile Grade Analysis Technical Memorandum, Parsons Brinckerhoff, October 29, 1997.
[10] San Francisco-Oakland East Bay Bridge Replacement, June 1998, prepared by T. Y. Lin International, A Joint Venture.

Single- and dual-tower configurations would meet seismic design criteria to provide a lifeline vehicular connection on the East Span alignment. Dual-tower configurations would require more columns and larger pile caps and footings compared to single-tower designs, increasing the amount of fill in U.S. waters and volume of Bay mud to be excavated during construction.

Following evaluation of seismic safety and aesthetic considerations, the EDAP recommended that main span design variations be designed with a single supporting tower. Based on the EDAP recommendation developed with extensive public comment during public meetings held in the spring and summer of 1998, the increased impacts to Waters of the U.S. required to construct dual towers, and the ability for all replacement alternatives to accommodate the single-tower main span design variations, the dual-tower design variation was withdrawn from further consideration.

Steel Retrofit

The option to retrofit the existing East Span columns with steel instead of encasing them in concrete was considered but was withdrawn from consideration.

The existing East Span has eccentrically braced steel frame towers that are the primary yielding (movement) points for seismic events. For the Retrofit Existing Structure Alternative, the primary yielding point for seismic events would be the junction of the substructure and the superstructure where the isolation bearings would be installed. Fundamental to this isolation strategy is that there would be no instability below the point of isolation. This would require that the existing towers be strengthened and stiffened. Concrete would provide this requisite stiffness.

It would also be possible to achieve the requisite stiffness using steel frames on the towers, but the construction methods are much more labor-intensive and costly than using cast-in-place concrete.

Other factors considered in selecting concrete encasement were that retrofitting with steel on a structure containing lead-based paint would require special measures for the protection of the public, workers, and the environment, and steel towers would require significantly more maintenance over the life span of the bridge.

Bicycle/Pedestrian Design Variations

Consideration of bicycle/pedestrian access options on East Span Project replacement alternatives was accomplished through a cooperative process among Caltrans, MTC, and members of the Bay Bridge Bicycle/Pedestrian Advisory Committee (BPAC). Alternative configurations for a path on the East Span replacement alternatives were considered in a series of workshops hosted by Caltrans in fall 1997 and early 1998. Several path locations were considered, including at-deck, below-deck, and above-deck, on either or both the westbound and eastbound structures; also considered was a path down the center between the decks. The outcome of the workshops, and

participation by the BPAC in the MTC Task Force public meetings, was the development of recommendations for either:

- A single path, 4.7 meters (15.5 feet) wide and 0.3 meter (1 foot) above the adjacent traffic lanes, located on the south side of the eastbound structure; or

- Two paths, each 3.3 meters (10 feet) wide at the same level as adjacent traffic lanes, located on the north side of the westbound structure and the south side of the eastbound structure.

BPAC's initial recommendation was a dual-path design, but was not selected by MTC because (1) the path on the north side of the westbound span heading uphill from Oakland to YBI could interfere with motorists' views, and (2) for security purposes (on days when the number of path users is moderate, it would be better to have users on one path than spreading them over two paths). The cost of the two paths would be greater and would require construction of a connection to the Oakland Touchdown area on the north side of the westbound lanes. This area would be immediately bordered by sand flats, eelgrass beds, and Bay waters, which would involve environmental and construction access constraints that do not exist with the single-path design. Based on the MTC Task Force recommendation, the dual-path and no-path design variations were withdrawn from further consideration and the replacement alternatives' descriptions were modified to include the single, south-side path.

2.7.10 Temporary Detours on Yerba Buena Island Considered and Withdrawn

Optional configurations and locations of YBI temporary detours were evaluated in an effort to avoid or minimize impacts to USCG and Navy facilities. Possible temporary detour configurations were to locate:

- Both eastbound and westbound temporary detours to the north of the existing East Span and each of the replacement alternatives;

- The westbound temporary detour north and the eastbound temporary detour south of the existing and replacement structures; or,

- Both temporary detours south of the existing and replacement structures.

Each of these configurations was analyzed for construction feasibility, impacts to YBI resources, traffic operational impacts, costs, and impacts on the project schedule. Based on analysis of conceptual engineering designs for the temporary detour options, the temporary detour options described below were withdrawn from further consideration.

Replacement Alternatives N-2 and N-6 North-north Temporary Detour Option

The north-north temporary detour would start as a double-deck roadway that becomes two side-by-side roadways approximately 200 meters (1,312 feet) east of the YBI

tunnel. The temporary detour would provide roadway connections from the eastern portal of YBI to the new eastbound and westbound main span structures and would not require connection to the existing truss bridge to accommodate traffic during construction. During construction, westbound traffic would travel directly from the new bridge to the westbound temporary detour lanes to the existing viaduct and tunnel, and eastbound traffic would travel directly from the tunnel and existing viaduct to the temporary detour lanes and onto the new bridge (see Figures 2-16.1 and 2-17.1 in Appendix A). The westbound lanes of the temporary detour would span the Admiral Nimitz house (Quarters 1), which was listed on the National Register of Historic Places in 1991. Quarters 1 is located within the Senior Officers' Quarters Historic District, which is eligible for listing on the National Register of Historic Places.

To provide the necessary support for the westbound temporary detour, a column would need to be placed within the eastbound traffic lanes at the point where the temporary detour makes a transition from a double-deck roadway to a side-by-side roadway. This would include a separation of lanes to both sides of the column, with three lanes on one side and two on the other side.

It was determined that splitting the eastbound mainline traffic would not be acceptable, primarily for traffic safety reasons. The column, even with appropriate crash cushion protection, would present a hazard. A single incident at the location could directly affect the operations of all five lanes, resulting in significant traffic and safety issues. The eastbound on-ramp from YBI is also in close proximity to the location of this lane split and column, creating an additional friction point within that section of roadway. Placement of a critical structural support element in the middle of mainline traffic was therefore determined to be too high a risk with regard to driver safety and structural integrity. For these reasons, the north-north temporary detour was determined to be unacceptable for the northern alternatives.

Replacement Alternatives N-2 and N-6 South-south Temporary Detour Option

The south-south temporary detour would be a full-length double-deck structure located south of the existing transition structure. Westbound traffic would travel on the upper deck of the existing bridge to the upper deck of the temporary detour, then to the YBI viaduct and tunnel. Eastbound traffic would exit the tunnel onto the lower deck of the temporary detour, then onto the lower deck of the existing bridge.

Eastbound traffic traveling from the YBI tunnel would be split around several columns with three travel lanes on one side of the columns and two lanes on the other. This would create a hazardous obstruction in the middle of mainline traffic lanes similar to that for the north-north temporary detour.

The south-south temporary detour option would minimize temporary ground disturbance to U.S. Navy property on YBI, although temporary impacts to the USCG station would increase. Construction of the south-south temporary detour options would require that an 88-meter (288-foot) section of the existing bridge be cut away and removed and replaced with the temporary detour. The replacement section would be constructed on YBI, then lifted in place. This replacement operation would require

complete closure of the existing East Span in both directions for a period lasting days. The total number of consecutive days of bridge closure is not known, but is estimated to be two weeks minimum. Because of the magnitude of the task to detach and remove the section of the existing bridge, potential for the construction period to be extended would be great.

Based on the hazards to motorists caused by complexity of construction and the requirement for complete closure of the entire East Span over a number of days, the south-south temporary detour option was withdrawn from further consideration.

Replacement Alternative S-4 North-north Temporary Detour Option

The north-north temporary detour option for Replacement Alternative S-4 would be a double-deck structure constructed north of the existing transition structure and existing East Span. Westbound traffic would travel on the upper deck of the existing bridge to the upper deck of the temporary detour then to the YBI tunnel. Eastbound traffic would exit the tunnel onto the lower deck of the temporary detour, then onto the lower deck of the existing bridge.

The north-north temporary detour option would be constructed as described for the south-south temporary detour option. It was withdrawn from further consideration for the constructibility and traffic operations reasons discussed for the south-south temporary detours.

Replacement Alternative S-4 South-south Temporary Detour Option

A south-south temporary detour for Replacement Alternative S-4 would be two parallel structures. Westbound traffic would be temporarily detoured from the existing bridge to the new structure and back to the tunnel. The eastbound structure would be placed south of the transition structure and existing East Span.

A south-south temporary detour option was identified for its potential to avoid temporary disturbance to U.S. Navy properties. However, it would have placed a temporary detour over residential buildings at the USCG station and temporary detours in the Bay. More detailed investigation indicated that the south-south temporary detour option would affect construction staging for Replacement Alternative S-4. Construction of the westbound temporary detour would conflict with placement of columns for the replacement structure and construction of the eastbound deck of the replacement structure. Based on the construction phasing conflicts, the south-south temporary detour option was withdrawn from further consideration.

CHAPTER 3
AFFECTED ENVIRONMENT

This chapter describes the physical and socioeconomic setting of the proposed SFOBB East Span Seismic Safety Project (East Span Project) and provides the baseline used to evaluate potential impacts. The project area encompasses land between the western portal of the Yerba Buena tunnel and the SFOBB Toll Plaza on the Oakland Touchdown area (Figure 2-2 in Appendix A). The project area includes additional land on Yerba Buena Island (YBI) to allow for construction activity related to the project. In the Bay, the project area includes sufficient area to accommodate all of the proposed alignments and allow for construction-related activity as described in Chapter 2.

In some locations, an area beyond the physical limits of the project, as described above is considered if there is the potential for environmental impacts to occur beyond those limits. Project area boundaries are described within individual sections of this chapter where they differ from the boundaries shown on Figure 2-2 in Appendix A. Where the term "Region" is used in this chapter, it refers to the entire nine-county Bay Area.

The following technical studies and analyses containing detailed information were conducted for the SFOBB East Span Project.

"Addendum Archaeological Survey Report – Maritime Archaeology," March 2000

"Addendum Finding of Adverse Effect," October 1999

"Air Quality Study Memorandum," March 1998

"Bicycle and Pedestrian Study Report," September 1998

"Biological Assessment," June 1999

"Biological Assessment (Retrofit Existing Bridge Alternative)," November 1996

"Community Impact Assessment," September 1998

"Conceptual Mitigation Plan for Special Aquatic Sites," November 2000

"Consideration of Proposed Mitigation Measures for Project Effects on Historic Buildings and Structures," September 1999

"CCSF S-1 Modified Alignment and the Impacts to the EBMUD Sewer Outfall," November 1999

"Dredged Material Management Plan," June 1999

"Final Relocation Impact Report," April 2001

"Finding of Adverse Effect: Buildings and Structures," September 1998

"Finding of Effect for Archaeological Resources," July 1998

"Hazardous Wastes Assessment," September 1998

"Historic Architecture Survey Report," July 1998

"Historic Property Survey Report," April 1996

"Land Use Issues Associated with the SFOBB East Span Seismic Safety Project and the Naval Station Treasure Island Draft Reuse Plan," January 2000

"Location Hydraulic Study," September 1998

"Natural Environment Study," September 1998

"Noise and Vibration Study," September 1998

"Phase I Archaeological Survey Report – Maritime Archaeology," February 2000

"Positive Archaeological Survey Report," June 1998

"Retrofit vs. Replacement," April 2000

"Sediment Sampling and Analysis Report," June 2000

"Supplemental Draft Section 4(f) Evaluation," June 1999

"Traffic Circulation, Access and Parking Assessment," September 1998

"Treatment BMP Feasibility Study," December 2000

"Visual Impact Assessment," September 1998

These studies are available for review at the locations listed in the Preface of this document. (Note: Because the Positive Archaeological Survey Report and Finding of Effect for Archaeological Resources contain confidential information about the locations of archaeological resources, they are not available for review.)

3.1 COMMUNITY SETTING

This section describes existing land uses in the project area and identifies and analyzes existing and projected social conditions in the project area so that the economic, demographic, service, and fiscal impacts of the East Span Project can be evaluated.

Socioeconomic and demographic data are presented for the U.S. Census Tracts that are within the project area and that could be potentially affected by the East Span Project. Census Tract 4017 in Oakland includes the Oakland Touchdown area; Census Tract 179.02 includes Yerba Buena Island (YBI) and Treasure Island (TI). To provide context for census tract data, they are compared to data for the cities of Oakland and San Francisco (YBI and TI are part of the City of San Francisco). Because the SFOBB is a regional facility, some demographic data are also presented at the county level. Figure 3-1 in Appendix A shows the Oakland and YBI/TI census tract locations in the project area.

3.1.1 Existing Land Uses in the Project Vicinity

Yerba Buena Island and Treasure Island

YBI and TI are primarily federally owned properties. YBI is currently under jurisdiction of and owned by the U.S. Coast Guard (USCG) and the Department of the Navy (Navy) with the exception of the land for right-of-way for all alternatives for the project under consideration, which was recently transferred to Caltrans (see discussion below under Caltrans for more details). These federal agencies must approve any activity on their property. In general, the Navy owns the property north of the existing East Span, as well as the ramps to and from the bridge; the USCG owns most of the property south of the bridge. See Figure 3-2 in Appendix A for the jurisdictional boundary. The Navy also owns TI and the causeway connecting YBI and TI.

YBI is a 59-hectare (147-acre) natural island. The USCG facility consists of 17 hectares (41 acres) and is located south of the existing SFOBB East Span. The area on YBI owned by the Navy is 34 hectares (86 acres). The existing East Span connects to the West Span at the YBI tunnel, which runs through the middle of the island. The Caltrans permanent right-of-way is 8 hectares (20 acres).

TI is a 163-hectare (403-acre) man-made island created by placement of fill in the Bay. A man-made causeway located northwest of YBI connects the two islands.

U.S. Navy. The Naval Station Treasure Island (NSTI), which comprises the Navy property on YBI and TI, encompasses 197 hectares (489 acres) of land. The NSTI was operational from the 1940s until 1997, when it was decommissioned. Within Navy jurisdiction on YBI, there are about 10 buildings previously used by the military primarily for storage, communications, fire safety, and administrative purposes. In addition, there are 105 housing units, 10 of which are large single-family residences originally built for officers; the remainder are 2, 3, and 4-unit buildings, generally single-story. Of these 105 units, about 95 housing units, located on the western and central parts of YBI, are currently occupied as market-rate civilian housing.

Land uses on the eastern side of YBI within the vicinity of the existing East Span include Quarters 1-7, shown on Figure 3-2 in Appendix A. Quarters 1-7 were built in the early 1900s as officers' quarters and comprise a Historic District eligible for listing on the National Register of Historic Places (refer to Section 3.10 for a discussion of Historic and Cultural Resources). Quarters 1-7 are currently undergoing renovation

and will eventually be leased out by the City and County of San Francisco (CCSF) as locations for events and meetings. Two other buildings (Buildings 213 and 262) are located on the eastern side of YBI. Building 213 is currently vacant; however, a fire truck owned by the CCSF is stored inside. Building 262, known as the Torpedo Building, was constructed in 1891 and is eligible for the National Register of Historic Places (see Section 3.10 — Historic and Cultural Resources). This building is vacant.

The 163 hectares (403 acres) at TI support 150 military buildings and 904 housing units. The military buildings served a broad range of functions, including medical/dental offices, a fire training facility, prison, administrative offices, a conference center, restaurants, and barracks, as well as storage for equipment and other miscellaneous items for a total of 0.23 million square meters (2.5 million square feet).

The Navy is seeking to dispose of its property on YBI and TI under the Defense Base Closure and Realignment Act of 1990, as amended. Through this process, jurisdictional authority will pass from Navy control, and the property within the former naval station will be available for reuse.

The laws and regulations guiding the base closure process require the Navy to consult with the Local Redevelopment Authority (LRA) and consider the LRA's plans as it decides how to dispose of NSTI. The CCSF is the LRA recognized by the Department of Defense as the agency responsible for planning the redevelopment of former NSTI. Accordingly, the Navy is working with the CCSF to coordinate base closure activities. A discussion of redevelopment plans for YBI is included in Section 3.1.2 below.

Notwithstanding the CCSF's status as the LRA in the base closure process, the Navy has not yet completed its analysis for the disposal and reuse of NSTI pursuant to the National Environmental Policy Act (NEPA). Although the Navy must consider the CCSF's plans for NSTI, the Navy has discretion to evaluate and decide among competing requests for the excess land. Pursuant to NEPA, the Navy must consider all reasonable disposal alternatives, including a "no action" alternative; the Navy has not disclosed what other alternatives are being considered; these will be publicly disclosed when the Navy circulates its Draft Environmental Impact Statement (DEIS) for the disposal and reuse of NSTI.

On October 25, 2000 and pursuant to 23 USC 107(d), the Federal Highway Administration (FHWA) executed a Federal Land Transfer of some land on YBI formerly owned by the United States. The right-of-way for the Interstate System was required over lands owned by the Department of the Navy. FHWA transferred land to Caltrans to give the state adequate right-of-way and control of access for construction of any of the alternatives for the East Span Project. There will be no physical changes until the Record of Decision (ROD) is approved for the East Span Project and construction begins. This Federal Land Transfer does not limit the evaluation of alternatives for the East Span Project, since the boundaries of the land transferred can accommodate any of the project alternatives under consideration. Any rights-of-way not required for the East Span Project will revert to the United States after project completion. The deed for

conveyance of property was recorded on October 26, 2000, with the CCSF County Records Office.

U.S. Coast Guard. The remaining property on YBI is owned by the USCG. It encompasses about 17 hectares (41 acres). The focus of USCG operations is a narrow half-mile strip of land at the eastern edge of the island. From this location, the USCG performs a variety of functions, including 24-hour search and rescue, law enforcement, and buoy repair and maintenance. Vessel traffic service is performed from a large communications tower at the top of YBI. Because of its search and rescue and law enforcement responsibilities, it is essential that the USCG be located at a waterfront site where boats can quickly accelerate to full speed. It is also very important for the unit to be centrally located to maintain adequate response times to emergency calls in the central and southern Bay.[1]

Residential facilities are provided for about 78 USCG personnel or USCG dependents who live on-site. Accommodations are also provided in the barracks for an additional 30 on-duty and temporary personnel. The Bachelor Enlisted Quarters (BEQ) encompasses 54 rooms with approximately 68 residents in a group of four buildings. There are also five single-family homes on the island for the families of officers housing approximately ten residents.

USCG administrative facilities on YBI consist of the following buildings (see Figure 3-2 in Appendix A):

- Building 40 - located at the entrance of the USCG facility. It is a two-story building used for administration;
- Buildings 22 and 23 - Station and group command office buildings located adjacent to the BEQ;
- Buildings 1-7 and 10-13 - A group of two- and three-story buildings located south of the buoy maintenance and repair area;
- Building 278 - Vessel Traffic Service (VTS) located on the main deck of a prefabricated metal building at the top of the YBI hill;
- Building 30 - equipment storage;
- Building 75 - storage; and
- Building 270 - vacant.

Industrial buildings are located at the southern end of the island. Maintenance, repair, and painting of buoys for the entire Bay Area are done at these industrial buildings.

[1] *Draft Group San Francisco Master Plan*, United States Coast Guard, 1995.

Recreational facilities on the island consist of outdoor tennis, basketball, and volleyball courts and a barbecue pit located next to Building 75.

Caltrans. As noted in this section under "U.S. Navy," the FHWA has transferred land, including fee ownership and construction easements, to Caltrans. The area now owned by Caltrans starts approximately 152 meters (500 feet) west of the western tunnel portal and runs through the tunnel and ends at about 256 meters (840 feet) east of the eastern tunnel portal for a total length of approximately 571 meters (1,875 feet). The width of the Caltrans property varies on the north side up to 44 meters (145 feet) from the centerline of the existing bridge and up to 38 meters (125 feet) from centerline on the south side.

Oakland Touchdown Area

The SFOBB touches down in the City of Oakland on a spit of land north of Port of Oakland facilities and west of the I-80/I-880/I-580 Interchange (distribution structure). The land in this area is owned by a number of public agencies, including the City of Oakland, the Port of Oakland, the State of California, and the U.S. Army. (Refer to Figure 3-3 in Appendix A.)

The State of California has a permanent easement for the right-of-way where the current I-80/SFOBB alignment is located. This property extends approximately 50 meters (164 feet) from the outer boundaries of the westbound and eastbound I-80 alignments and includes a median area between the two directions of travel.

The SFOBB Toll Plaza is located approximately 200 meters (655 feet) west of the distribution structure and extends across the westbound I-80 lanes. SFOBB Toll Plaza administrative facilities, maintenance buildings, a tow-truck operations base, and the SFOBB Traffic Operations Center are located south of the SFOBB Toll Plaza within the median area. SFOBB Toll Plaza workers also park in this area.

A Caltrans maintenance road extends the length of the project area within the Oakland Touchdown area on the south side of I-80. The roadway continues under the SFOBB and provides access to the north side of the bridge. Burma Road is also located on the south side of the touchdown. It extends from Maritime Street to the west end of the touchdown and is roughly parallel to the maintenance road. Burma Road was constructed by the U.S. Army and is now used by the Port of Oakland under a lease agreement. This roadway is blocked to public vehicular access about 1.6 kilometers (1 mile) from the west end of the touchdown. At this point, traffic is diverted onto the Caltrans maintenance road.

Various Caltrans storage, repair, and maintenance facilities are located between the Caltrans maintenance road and Burma Road, at the west end of the Oakland Touchdown area. The Caltrans Bay Bridge Substation and the Key Pier Substation, which were used during the era when the bridge carried trains, are also located in this area and are currently used for Caltrans maintenance activities. An East Bay Municipal Utility District (EBMUD) final dechlorination treatment station and outfall are also located in this area. The sewer outfall is 2.4 meters (8 feet) in diameter, 5 kilometers (3.1 miles) long, and extends 1.6 kilometers (1 mile) into the Bay.

A storage area for Caltrans construction materials and maintenance activities extends for about 1.6 kilometers (1 mile) between the Caltrans maintenance road and Burma Road. This property is owned by the City of Oakland. A billboard owned by the Port of Oakland is also located within this area. It is designated for community non-profit organizations and Oakland Airport-related media.

Four additional Caltrans buildings are located south of the SFOBB Toll Plaza and the maintenance road. The buildings are used for storage, maintenance, and repair materials associated with general maintenance of the bridge.

South of the Oakland Touchdown Area. The Port of Oakland (Port) extends from the south side of the Oakland Touchdown area and continues south along the San Francisco Bay shoreline to the Inner Harbor between the cities of Oakland and Alameda. The Port is a highly developed area of industrial, maritime, transportation, and commercial uses. Its deep-water berths and container cranes are supported by a network of warehouses, roadways connecting to freeways, and intermodal railyards. The Port also operates numerous non-maritime-related activities along its 30 kilometers (19 miles) of shoreline, including commercial real estate, two airports, recreational parks, wildlife refuges, and industrial facilities.

The U.S. Army owns the property on the south side of the Oakland Touchdown area, including Burma Road. Army property extends from near the end of the touchdown eastward and includes land on the east side of Maritime Street. The Oakland Army Base Military Traffic Management Command Center operated from this property until the Oakland Army Base was decommissioned in September 1999. The Oakland Army Base Reuse Authority (OBRA) together with the U.S. Army, the City of Oakland, and the Port of Oakland, recently adopted the Oakland Army Base Reuse Plan through the Base Realignment and Closure (BRAC) process. The reuse plan is discussed in Section 3.1.2 — Developable Land and Development Trends. Within this property, the Port operates the Bay Bridge public terminal on the shoreline south of the SFOBB Toll Plaza. The terminal currently handles break bulk (non-containerized) cargo. The Port plans to operate the terminal in the near term.

A container freight storage area is located between Burma Road and the Caltrans maintenance road, south of the SFOBB Toll Plaza. AMNAV, a private shipping company, is located on the south side of Burma Road and uses Pier 8 (adjacent to the Bay Bridge public terminal) for tug services. Burma Road continues eastward where it intersects with West Grand Avenue. West Grand Avenue provides access to and from I-80. A large shipping container storage area is located on property west of this intersection.

North Side of the Oakland Touchdown Area. The strip of land on the north side of the East Span is designated as a Resource Conservation Area in the City of Oakland General Plan.[2] Caltrans has a permanent easement on the first 50 meters (164 feet) of land to the north of the bridge; beyond this boundary, the land is owned

[2] *City of Oakland General Plan*, March 1998.

by the Port of Oakland. The Resource Conservation Area continues nearly 3.2 kilometers (2 miles) eastward from the touchdown before turning northward towards Emeryville.

The first 1.6-kilometer (1-mile) stretch of shoreline in Emeryville, known as the Emeryville Crescent, provides sensitive habitat for a variety of wildlife and special status species. The project area for the East Span Seismic Safety Project ends at Radio Point Beach, roughly 1,000 meters (3,300 feet) from the western end of the touchdown and approximately 2.4 kilometers (1.5 miles) from the Emeryville Crescent (see Figure 2-2 in Appendix A).

3.1.2 Developable Land and Development Trends

Yerba Buena Island and Treasure Island

Yerba Buena Island. In July 1996, a Draft Naval Station Treasure Island Reuse Plan[3] (1996 Draft Reuse Plan) was approved by the Office of Military Base Conversion, the CCSF, and the San Francisco Redevelopment Agency in anticipation of the closure of NSTI.

The conceptual land use plan for development on the eastern side of YBI (shown on Figure 4-1 in Appendix A) calls for a mixture of residential and visitor-serving uses. As noted in the "Implementation Strategy" section of the 1996 Draft Reuse Plan, proposed residential uses would include construction of 13 artisan cottages and 75 live/work units in 4 buildings with a total area of 6,968 square meters (75,000 square feet). Visitor-serving uses would include a 5,574-square-meter (60,000-square-foot) conference center that would be associated with Quarters 1-7. A height limit of 12.2 meters (40 feet) for eastern YBI is shown in the Plan. The 1996 Draft Reuse Plan also proposed reuse of Building 262 for uses such as art studios, a community center, additional live/work space, or a restaurant.

For western YBI, the 1996 Draft Reuse Plan calls for immediate utilization of the existing housing stock for market rate and homeless housing programs. At this time, however, the existing units on YBI are utilized as market-rate housing only. The plan envisions phased demolition and redevelopment of the housing stock on western YBI to develop higher density residential units (90 units) with either a hotel (150 rooms), a condominium development (100 units), or a lower density single-family development of 65 lots.

The 1996 Draft Reuse Plan envisions that development of TI/YBI would occur in five phases. Each phase would build on the previous phase to generate the revenue necessary to make needed infrastructure improvements which, in turn, would allow for more intensive development in subsequent phases. The phased implementation process is projected to extend over a period of 35 years. Development on YBI is envisioned to occur in the first three phases of plan implementation spanning a 15-year period. Development on eastern YBI, near the East Span, including the conference

[3] The City and County of San Francisco, Office of Military Base Conversion, Planning Department and the San Francisco Redevelopment Agency, *Draft Naval Station Treasure Island Reuse Plan,* July 1996.

center, artisan cottages, and live/work units, is included in Phase 3 and is scheduled to begin in 2007.

The proposed redevelopment of YBI set forth in the 1996 Draft Reuse Plan is subject to review and approval by BCDC under federal and state law to determine whether the proposed transfer of land to the CCSF and the proposed redevelopment of YBI are consistent with the Park Priority Use designation for YBI in the BCDC Bay Plan. The proposed uses in the Draft Reuse Plan would require amending the existing San Francisco Bay Plan to delete the park priority use designation at YBI. The San Francisco Bay Plan states, "If and when not needed by the Navy and Coast Guard, redevelop released areas for recreational use."

Development intended for the southeastern half of YBI, owned by the USCG, will improve base facilities and amenities, including new residential and light industrial uses. USCG does not currently have a master plan in place.

Treasure Island. Due to present underutilization and revenue-producing potential, TI is expected to be subject to intense development over the next 35 years. The CCSF and the Navy are currently preparing an EIR/EIS for TI and YBI to evaluate environmental impacts of proposed development on the property proposed for conveyance to the CCSF from the Navy. A market assessment in the 1996 Draft Reuse Plan concluded that "publicly oriented recreation and entertainment attractions" have been identified as particularly well-suited for the site.

In addition to these types of uses, the 1996 Draft Reuse Plan also considers land uses that would accommodate community facilities, major utilities, film production studios, and opportunities for non-profit institutions. New housing and shoreline open space on TI are also presented as potential uses.

According to the 1996 Draft Reuse Plan, expansion of the Treasure Island Marina was originally scheduled for Phase 2 development. Since the plan was written, the marina project has been accelerated. The conceptual marina development plan was approved by the Treasure Island Development Authority. Approval of the final marina development plan will require certification of an environmental document in compliance with the California Environmental Quality Act (CEQA) and NEPA.

Construction of the Treasure Island Marina is scheduled to begin in mid- to late-2001, after approval of the final plan, environmental document, and BCDC permit.

Oakland Touchdown Area

The Port of Oakland, Caltrans, the East Bay Regional Park District (EBRPD), and EBMUD all have plans for development or maintenance of existing facilities on the Oakland Touchdown area. One of these plans is the creation of a public park at the western end of the Oakland Touchdown area. Planning for the park is being led by EBRPD (see discussion below under East Bay Regional Park District).

Caltrans will continue to use a portion of the Oakland Touchdown area for maintenance access to the bridge approach and the SFOBB. In addition, Caltrans is planning a

separate project to reconstruct the toll plaza/administration area located just east of the Oakland Touchdown area.

Port of Oakland. The Port and the City of Oakland are currently seeking conveyance of the Oakland Army Base (OARB) located just south of the current eastern terminus of the SFOBB for economic and community development purposes. Under the existing plan, the 1998 Draft Final Reuse Plan for the Oakland Army Base (July 27, 1998) (Draft Final Reuse Plan), the Port of Oakland would develop a 194-acre Maritime District, including the OARB properties located west of Maritime Street and an expanded Knight Rail Yard. The City of Oakland would develop most of the remaining OARB area for non-maritime uses, with a primary focus on industrial, business, technology, and workforce training uses.[4]

The OBRA is considering a proposal to revise its Draft Final Reuse Plan. Under the proposed revised Draft Final Reuse Plan, the Port of Oakland would develop lands east of Maritime Street (located southeast of the Oakland Touchdown area outside of the project area limits) for maritime uses. The City of Oakland would develop the areas south of Burma Road as non-maritime uses (see Figure 3-3 in Appendix A). The reuse plan for the OARB, including the proposed revised plan, must be approved by OBRA, subject to environmental review.

The proposed revised Draft Final Reuse Plan for the Oakland Touchdown area, if approved by OBRA, would include conveyance of 4.9 hectares (12 acres) to the EBRPD for development of the Gateway Park at the western end of the Oakland Touchdown area. In the first iteration of the plan, this park was also included. FHWA has determined that the land to be conveyed is a protected Section 4(f) resource.

The San Francisco Bay Area Seaport Plan (Seaport Plan) identifies long-range plans by the Port of Oakland (Port) to expand its operations. The plan, originally approved by BCDC in 1982 and last amended in 1997, allows for expansion of Port facilities to 2017. Before Port expansion can proceed using Bay fill, marine terminal projects must meet the criteria specified in Section 66605(c) and (d) of the McAteer-Petris Act, administered by BCDC. Expansion plans are designed to meet the projected 2020 cargo volumes estimated in the Seaport Plan. Development of the Port's Joint Intermodal Terminal (JIT), located outside the East Span Project area limits, is currently under way.

On January 4, 2001, BCDC voted to amend the San Francisco Bay Plan and Seaport Plan by the "Port Priority Use" area designation from the Bay Bridge Site, Pier 7, and Bay Bridge Terminal (see Figure 3-3 in Appendix A). Deleting the "Port Priority Use" designation from these areas will allow the City of Oakland to implement a development plan for the area to accommodate non-maritime land uses. The deletion also eliminates the inconsistency between the BCDC's "Port Priority Use" designation and OBRA's designation of the land as a future park.

[4] The Oakland Army Base Reuse Authority, July 27, 1998, *Draft Final Reuse Plan for the Oakland Army Base*, Executive Summary, p. S-2.

Bay Conservation and Development Commission (BCDC) Permit 11-93.[5] As part of the I-880/Cypress Freeway Replacement Project, Caltrans is required by BCDC to provide and maintain a public access bicycle/pedestrian pathway system connecting the cities of Emeryville and Oakland between Shellmound Street and Nelson Mandela Parkway, through the distribution structure for I-80 to the Oakland Touchdown area. Caltrans is also required to provide two scenic overlooks, a 465-square-meter (5,000-square-foot) outlook on the north side of the Oakland Touchdown area and a 232-square-meter (2,500-square-foot) lookout area on the south side of the area. Both overlook areas would include public amenities such as restrooms, parking, benches, a fish cleaning facility, trash cans, and native landscaping. The EBRPD has plans to develop a much larger public park in the same area (see below). If the locations of all or portions of the conceptual overlooks and bikeway alignments prove infeasible due to replacement of the existing bridge, the permit conditions allow Caltrans to pay a fee in lieu of constructing the improvements, subject to BCDC approval.

East Bay Regional Park District (EBRPD). The EBRPD Advanced Planning Division is evaluating lands at the Oakland Touchdown area for potential acquisition and stewardship to develop an approximately 5.9-hectare (14.7-acre) public park to the south of the existing bridge and approach. Subsequent to publication of the East Span Project DEIS in 1998, the EBRPD was designated by OBRA as the lead agency in developing the proposed Gateway Park at the western end of the Oakland Touchdown area. EBRPD's Advanced Planning Division is coordinating park planning among the City of Oakland, the National Park Service, BCDC, and the Port of Oakland.

3.1.3 Adopted Goals and Policies

Land Use Policies

In addition to Caltrans, the public agencies with jurisdiction over or interest in land use in the project area are the Navy, the CCSF, City of Oakland, Port of Oakland, USCG, the EBRPD, BCDC, and EBMUD. This section reviews their existing policies and planning documents and identifies the guiding principles that relate to the proposed project.

U.S. Navy. The Navy is in the process of transferring the property known as NSTI as part of the BRAC process. For the purposes of the East Span FEIS, Caltrans assumed that the CCSF is the intended recipient of YBI. This assumption was based on the 1996 Draft Reuse Plan, the CCSF's role as Local Reuse Authority, and the currently in-force Base Caretaker Agreement between the Navy and CCSF. The transfer of property will be completed over the next few years.

The City and County of San Francisco/Treasure Island Development Authority. In 1997, the California Legislature passed AB699, the Treasure Island Conversion Act, vesting the Treasure Island Development Authority (TIDA) with full redevelopment authority for NSTI. In April 1997, the CCSF Board of Supervisors

[5] BCDC Permit No. 11-93 issued on June 8, 1994 (with amendments made October 19, 1994, April 14, 1995, and July 31, 1998). One more amendment is expected.

adopted Resolution 380-97 establishing TIDA as a nonprofit planning benefit corporation to promote the redevelopment of TI/YBI. The CCSF is projected to acquire ownership of TI and portions of YBI in the year 2003. A caretaker agreement between the CCSF and the Navy is currently in place. The caretaker agreement defines levels of maintenance on TI during the transfer and conveyance process and defines funding and service responsibilities. The 1996 Draft Reuse Plan serves as the guide for future activities on TI and CCSF-owned portions of YBI.

The following is a summary of land use policies from the 1996 Draft Reuse Plan which are relevant to development on YBI:

- Provide for new civilian uses that contribute to the economic well-being of the islands and San Francisco by generating jobs and revenues;
- Limit uses to those that can be accommodated primarily by ferry;
- Allow flexibility to respond to market opportunities and changes in technology over time;
- Attract initial uses and users that facilitate and are compatible with the development of desired long-term uses;
- At YBI, there are two sites where visitor-oriented uses are envisioned. They include: (1) the eastern end of the island where a portion of the property could be developed as an attraction that is tied by boat to activities taking place at TI; and (2) Quarters 1-7, which could be used for conference facilities and limited lodging; the properties total 5,574 square meters (60,000 square feet);
- Provide for the opportunity for publicly oriented uses at YBI;
- Allow for the expansion of publicly oriented uses;
- If the publicly oriented uses require a larger "footprint" and if circumstances make other properties available, the expansion of publicly oriented uses should be accommodated;
- In certain cases, areas are shown with multiple land use designations, providing the opportunity at TI and YBI to retain some flexibility and create an opportunity for a broader range of potential activities;
- Publicly oriented uses are a possibility at Yerba Buena Island, in the flatter areas on the eastern end of the island (including Quarters 1-7);
- Focus public open space on the natural features and amenities of the island setting;
- Protect hillside and shoreline open space at YBI;

- Maintain and expand waterfront recreational and transportation facilities to enliven the water's edge and improve access;

- The opportunity for ferry facilities should be developed (where possible) along YBI. In addition, the opportunity for berths and floats to serve smaller craft (such as water taxis) as well as ferries should be provided;

- Provide a range of institutional uses that can satisfy a broad range of public purposes. Encourage collaboration between users to reduce costs for facilities and services;

- Provide for existing and new housing at YBI; and

- For Yerba Buena Island, residential uses may include single-family attached and detached as well as live/work studios and artisan cottages. A maximum of 300 units would be allowed at YBI and would be distributed in both the hillside and flat land areas. As a general land use policy, the 300 housing unit figure is given by the 1996 Draft Reuse Plan to establish an upper limit of housing density on the island.

The City of Oakland. *Envision Oakland* is the title of the Land Use and Transportation Element of the Oakland General Plan that was adopted March 24, 1998. This document contains policies and actions for implementation of the community's vision for Oakland. *Envision Oakland* includes land use designations for the Oakland Touchdown area and adjacent areas.[6]

- The land immediately adjacent to the north of the existing touchdown is designated as Resource Conservation Area;

- The land immediately adjacent to and south of the existing touchdown is designated as General Industrial/Transportation; and

- An unspecified site within the land to be released by the Army as part of the Oakland Army Base Reuse and Closure Process, located on the southern half of the Oakland Touchdown area, has been proposed as Park and Open Space.

Transportation policies found in *Envision Oakland* reflect the City's priority to maintain exceptional access to and through Oakland for the wide variety of transportation modes that have historically existed within the city.

The Port of Oakland. As noted in Section 3.1.2 — Developable Land and Development Trends, the Port of Oakland and the City of Oakland have proposed a revision of OBRA's Draft Final Reuse Plan. The proposed revised Draft Final Reuse Plan would include policies to guide Port of Oakland development outside the project

[6] The City of Oakland, *Envision Oakland* (Draft for Public Hearings), October 1997, adopted March 24, 1998.

area and, if approved, would also convey land to the City of Oakland for economic development purposes.

U.S. Coast Guard. Although the USCG regularly prepares master plans for its various facilities, the USCG facility on YBI does not currently have a master plan in place. Finalization of a draft master plan, prepared in September 1995, is pending the results of the TI BRAC process and the final design for the East Span Project. Once the final design for the East Span Project has been chosen, the amount of land required from the USCG property can be determined. The completed master plan for the USCG properties will be based upon land remaining available for development.

East Bay Regional Park District. The EBRPD Master Plan (December 17, 1996) does not discuss specific areas within the East Bay. Instead, it presents the policies and procedures to be used for acquisition and stewardship of any lands to be placed under EBRPD management. As noted in Section 3.1.2 — Developable Land and Development Trends, the lands at the west end of the Oakland Touchdown area are currently being evaluated by the EBRPD Advanced Planning Division for potential acquisition and stewardship. The EBRPD has gone on record with BCDC stating its intention to develop a park (Gateway Park) on the Oakland Touchdown area.

The San Francisco Bay Conservation and Development Commission. The BCDC is a state agency and was created by the McAteer-Petris Act to regulate development in and around San Francisco Bay. After its creation, BCDC was designated as the Federal Coastal Zone Management Agency for San Francisco Bay in accordance with the Federal Coastal Zone Management Act (CZMA). The purpose of the CZMA is similar to that of the McAteer-Petris Act, to regulate development in coastal areas and to protect their unique resources. Under the McAteer-Petris Act, BCDC has jurisdiction over the entire Bay and a shoreline band 30 meters (100 feet) shoreward of the mean high tide line.

The McAteer-Petris Act contains findings and declarations that recognize the rapid development around the Bay and that establish the framework for developing and implementing the San Francisco Bay Plan. The McAteer-Petris Act addresses the need to allow for water-oriented land use while protecting the Bay from unnecessary filling and maximizing public access. Section 66602 states that "the San Francisco Bay Plan should make provision for adequate and suitable locations for certain water-oriented land uses along the Bay shoreline that are essential to the public welfare of the Bay Area, thereby minimizing the necessity for future Bay fill to create new sites for these uses. Maximum feasible public access should also be provided."

The McAteer-Petris Act provides additional guidelines to regulate fill within the Bay. The guidelines include the following recommendations:

- "That further filling of San Francisco Bay and certain waterways should be authorized only when public benefits from fill clearly exceed public detriment from the loss of the water areas and should be limited to water-oriented uses or minor fill for improving shoreline appearance or public access to the Bay;

- That fill in the Bay and certain waterways for any purpose should be authorized only when no alternative upland location is available for such purposes;
- That the water area authorized to be filled should be the minimum necessary to achieve the purpose of the fill;
- That the nature, location and extent of any fill should be such that it will minimize harmful effects to the Bay Area;
- That public health, safety and welfare require that fill be constructed in accordance with sound safety standards which will afford reasonable protection to persons and property against the hazards of unstable geologic or soil conditions or of flood or storm waters; and
- That fill should be authorized when the filling would to the maximum extent feasible, establish a permanent shoreline.

As part of its statutory mandate under the McAteer-Petris Act, BCDC prepared the San Francisco Bay Plan as its master planning document for San Francisco Bay. The Plan, adopted in 1969, as amended, outlines policies to guide future uses of the Bay and shoreline. The Bay Plan includes maps that apply these policies to the present Bay and shoreline.

Note: On November 4, 1999, BCDC voted 15-0-0 "...to support a solid fill alternative (vs. pile-supported fill) as most appropriate for the portion of the proposed East Span replacement structure where it reaches the shoreline in Oakland."[7] The vote was advisory and does not constitute granting of a permit.

The following Bay Plan policies are applicable to the current project:

- Any route over the Bay will be subject to: (a) placement on structure, not fill; (b) providing navigational clearance; (c) avoiding new fill for ancillary facilities , if possible; and (d) considering mass transit facilities (Transportation Policy 4) for new structures;
- Sedimentation resulting from dredging projects should be limited by: (a) placement as fill in approved fill projects; (b) barging or piping to suitable disposal sites in the ocean; (c) placement on dry land; or (d) if no other alternative is feasible, dumping in designated parts of the Bay (Dredging Policy 2;
- "Yerba Buena Island – If and when not needed by Navy or Coast Guard, redevelop released areas for recreational use";
- Marshes and mudflats should be maintained to the fullest possible extent to conserve fish and wildlife and to abate air and water pollution. Filling and diking that eliminate marshes and mudflats should, therefore, be allowed only for

[7] BCDC commission meeting minutes, November 4, 1999.

purposes providing substantial public benefits and only if there is no reasonable alternative. Marshes and mudflats are an integral part of the Bay tidal system and, therefore, should be protected in the same manner as open water areas; and

- New or remodeled bridges should be designed to permit maximum viewing of the Bay and its surroundings by motorists and pedestrians. Guard rails and bridge supports should be designed with views in mind.

The San Francisco Bay Area Seaport Plan, prepared by BCDC and the Metropolitan Transportation Commission (MTC), constitutes the maritime element of MTC's Regional Transportation Plan and is incorporated into BCDC's San Francisco Bay Plan. The relationship of the Seaport Plan to the project was addressed in Section 3.1.2 — Developable Land and Development Trends under "Port of Oakland."

East Bay Municipal Utility District (EBMUD). EBMUD owns, operates, and maintains facilities on the Oakland Touchdown within the project area. In letters of comment, EBMUD has expressed its concern with the potential environmental and financial problems resulting from construction of a southern alignment (see Section 3.1.6 — Community Services below).

3.1.4 Demographic Characteristics of the Project Area and Inclusive Census Tracts

The project is located within census tracts 179.02 which includes TI and YBI, and 4017 which includes a portion of West Oakland (Figure 3-1 in Appendix A). Although the project is located within these census tracts, the project area limits include YBI and the Oakland Touchdown area (Figure 2-2 in Appendix A) and do not contain any large populations or cohesive communities.

Demographic information for the two census tracts within the project study area is presented below. Each subsection includes a description of the demographic characteristics for the project area limits and the larger census tract.

The 1990 Census information does not reflect the current demographic profile of YBI/TI, due to the closure of Naval Station Treasure Island in September 1997. Consequently, the demographic profile is based on the TI project website, field surveys and interviews with Treasure Island Development Authority and Treasure Island Homeless Development Initiative staff. The 1990 Census is used for demographic information for the Oakland Touchdown area and adjoining census tract.

Detailed demographic information for the nine-county Bay area region can be found in the Community Impact Assessment technical report.

Household Characteristics

Project Area. On YBI, housing at the USCG facility consists of dormitory type housing (BEQ), and five single-family homes (occupied by officers). The total resident population at the facility is approximately 78 people.

On the portion of YBI under Navy ownership, the housing stock is managed by the Treasure Island Development Authority. The 95 multi-family housing units on YBI are leased at market rate to the general public.

There are no housing units within the project limits in the Oakland Touchdown area.

Outside the Project Area. All of the housing stock on TI consists of apartments, with the exception of the barracks which are dormitories. According to the Director of the Treasure Island Homeless Development Initiative, all of the available housing stock on TI is occupied by renters. The current resident population on TI is estimated to be 2,700. Of the 116 units currently leased as below-market rate housing, 66 units are occupied by families of 4 or more people and the remaining 50 are single-occupancy. An additional 96 units of below-market rate family housing is undergoing renovation and will be available soon.

According to the Treasure Island Project web pages, as of January 2000, 300 market rate units were rented on TI. Occupants include City of San Francisco employees (including teachers, firefighters, police officers) and college students.

The housing stock in Census Tract 4017, which includes the Oakland Touchdown area, was 62 percent renter-occupied according to the 1990 Census. Average household size in this census tract was 2.8 people per household. The closest housing units are located approximately 2.4 kilometers (1.5 miles) away from the project limits.

Ethnic Mix and Age Distribution

Project Area. The ethnic mix of the residents on YBI is likely to be diverse and reflect that of the San Francisco Bay Area.

Outside the Project Area. Of the 116 below-market rate units occupied on TI, families with 2 or more children occupy 66 units. The remaining 50 units are single-occupancy. Of the occupied below-market rate units, 80 percent of the population is African American and the remaining 20 percent represent other ethnic groups.

According to the 1990 Census, the population of Census Tract 4017 in West Oakland is 63 percent African-American, 16 percent Asian and 7 percent Caucasian. Other ethnic groups made up the remaining 21 percent of the population.

Jobs and Employment

Project Area. The USCG employs 149 military and 1 civilian personnel. The characteristics of the current YBI labor force (outside the USCG facility) have not been documented; however, it is assumed that employment on the island is centered on rehabilitation and maintenance of the housing stock and historic structures.

The unemployment rate for the CCSF, overall, is 3 percent.[8]

[8] State of California, Employment Development Department, Labor Market Information Division, Labor Force Data for Sub-County, 1999 Benchmark, March 28, 2000.

Outside the Project Area. The characteristics of the current TI labor force have not been documented. It is estimated that the daytime population on TI is 4,000. Employment centers on TI include the Job Corps Culinary Center, film studios, the Treasure Island Development Authority offices, a restaurant, convenience store, public services (police and fire) and the Treasure Island Elementary/Middle School.

Almost 30 percent of the labor force in Census Tract 4017 in West Oakland was employed in craft or laborer positions in 1990. The unemployment rate was 24 percent in 1990. The current unemployment rate for the City of Oakland, overall, is 5.5 percent.[9]

According to a 1995 survey, there were approximately 488 businesses and employers in West Oakland (which includes areas outside of Census Tract 4017). At the time of the survey, the largest employer in the West Oakland community was the United States Postal Service.[10] Another large employer, the Oakland Army Base, was closed in 1999 and is undergoing the base realignment and closure process to transfer the land to the City of Oakland and the Port of Oakland.

Income Levels

Project Area Limits. Income information for residents of YBI is not available until the 2000 Census is released.

Outside the Project Area. To qualify for the below-market rate housing on TI, residents must meet the U.S. Department of Health and Human Services income criteria, which in 2000 is $17,054 for a family of four. Income level information for other residents and military personnel is not available. None of the below-market rate housing is within the project area on YBI, so there is no identifiable low-income population on YBI.

In 1990, 21 percent of the residents of Census Tract 4017 were classified as living below the poverty level. Average household and per capita incomes were approximately 50 percent lower than Oakland as a whole. There are no households (low-income, minority, or otherwise) within the project area at the Oakland Touchdown area.

3.1.5 Fiscal Conditions

San Francisco

Primary sources of the CCSF General Fund are various taxes and state subventions. Approximately 30 percent of the 2000-2001 General Fund came from tax revenues; the remaining 70 percent is derived from federal and state grants, charges for specific purposes, and other revenues.

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[9] State of California, Employment Development Department, Labor Market Information Division, Labor Force Data for Sub-County, 1999 Benchmark, March 28, 2000.

[10] Economic Development Advisory Board of the County of Alameda, *West Oakland 2000 Transportation and Economic Development Study*, 1997.

According to the Mayor's 2000-2001 budget, 41 percent of the General Fund was for public works and transportation, 11 percent for public health, 17 percent for social services, 5 percent for culture and recreation, 7 percent for administration and finance, 6 percent for general obligations, and 13 percent for public protection.

The CCSF prepared the 1996 Draft Reuse Plan to address redevelopment of TI and portions of YBI currently and formerly owned by the Navy. Some of the land formerly owned by the Navy was recently transferred to Caltrans. The land was transferred to give the state adequate right-of-way and control of access for construction over lands for the East Span Project. A large investment in infrastructure is required to support redevelopment and, as noted in Section 3.1.2 — Developable Land and Development Trends, planned development of TI/YBI will be phased in order to generate revenue to pay for necessary infrastructure improvements.

Oakland

The city share of property tax which goes into the Oakland General Fund is less than 22 percent. The largest share of property tax collected in Oakland goes to Alameda County, special districts, and school districts. In the 1998-99 budget, 53 percent of the General Fund was allocated to police and fire activities, 8.3 percent went to public works and neighborhood development, and 8.6 percent was for culture and recreation.

3.1.6 Community Services

Utilities

Water Supply. The San Francisco Water Department (SFWD) supplies water to TI and YBI via steel pipes attached to the West Span. Backup water supply is provided by a line on the East Span that is owned by the Navy and is operated and maintained by the CCSF through a caretaker agreement. The pipeline conveys water from the EBMUD. Both sources of water are used for fire protection and domestic purposes.[11] (Refer to Figures 3-30a and 3-30b in Appendix A for existing utilities on YBI and the Oakland Touchdown area.)

EBMUD is also responsible for the water supply at the Oakland end of the bridge. It has a supply pipe to the SFOBB Toll Plaza and Caltrans maintenance buildings, as well as pipelines that traverse the property of the former Oakland Army Base.

Sewer and Sewage Treatment. All wastewater generated on TI and YBI is treated at the sewage treatment plant located at the northeast corner of TI.[12]

Sewage service and treatment in the East Bay are provided by EBMUD. The treatment plant is located just south of the distribution structure to the east of the SFOBB Toll Plaza. A major EBMUD sewer outfall line parallels the bridge approach to the south. Other EBMUD facilities include an effluent pump station near the SFOBB Toll Plaza, a dechlorination facility south of the eastbound lanes approximately 183 meters (600

[11] *Treasure Island Reuse Plan, Physical Characteristics, Building and Infrastructure Conditions*, June 1995.

[12] *TI Reuse Plan, Physical Characteristics, Building and Infrastructure Conditions*, June 1995.

feet) east of the existing bridge takeoff point, and an outfall drop structure adjacent to the shoreline where the outfall transitions to the water.[13] (Refer to Figure 3-3 in Appendix A.)

Storm Drains. At the Oakland Touchdown, the storm drain system consists of pipes and various outfalls along the perimeter of the spit, which discharge directly into San Francisco Bay. The storm drain system on TI/YBI consists of pipes and various outfalls along the perimeter of TI and YBI, which discharge directly into San Francisco Bay.

Electrical Infrastructure. Electrical power is provided to TI and YBI via a Navy-owned power line which is elevated along the south side of the approach to the bridge, crosses under the bridge, and then transitions near the incline to a 12 KV (in a 34.5 KV casing) submarine cable owned by the Navy and the CCSF. The Oakland cable is connected to the Navy's Davis Substation located at the former Fleet and Industrial Supply Center (FISC) site in Oakland.

In the Oakland Touchdown area, there are several electrical power lines. South of the existing SFOBB, there are a 480 KV and two 12 KV overhead lines mounted on poles. One 12 KV line is owned by Caltrans. The other 12 KV line and the 480 KV line are owned by Pacific Gas & Electric Co. (PG&E). From the substation, the 12 KV line extends underground onto the existing SFOBB. North of the existing SFOBB, there is an underground 5 KV line running along I-80.

Telecommunications Infrastructure. Telecommunications service is provided to TI and YBI from San Francisco via a conduit system located on the West Span of the SFOBB.

Pacific Bell and a consortium have fiber optic cables and telephone lines located south of the existing SFOBB on YBI and in the Oakland Touchdown area and on the existing SFOBB. Three mobile phone sites are located on YBI, owned by Verizon Communications, Cingular Wireless, and AT&T Wireless.

Natural Gas Infrastructure. Natural gas is provided to YBI and TI by PG&E from Oakland via a 254-millimeter (10-inch) diameter high-pressure submarine gas main. The line is located on the south side of the existing bridge, crossing under the bridge near the west end of the Oakland Touchdown and entering the Bay north of the bridge where it continues on to YBI/TI.

Police and Fire

The California Highway Patrol (CHP) has jurisdiction over I-80 and the SFOBB for matters involving both traffic and emergency services. Calls from the east and west segments of the bridge are taken by CHP offices in Oakland and San Francisco, respectively. Municipal police departments are not responsible for state bridges and roads unless they are asked to participate in a specific joint investigation or action.

[13] Jimmy Yoloye, EBMUD, oral communication.

The Oakland CHP office is located at 3601 Telegraph Avenue, close to the interchange of I-580, 24, and I-980 and approximately 1.6 kilometers (1 mile) east of I-80 and the approach to the SFOBB. The CHP office in San Francisco is located on Eighth Street adjacent to the on- and off-ramps for the bridge. In addition, there is a police station on TI which was taken over from the Navy and has been operated by the San Francisco Police Department since late 1997.

The delivery of fire and emergency services within the project area is shared by several jurisdictions, due to the complexity of access to the various segments of the SFOBB and the YBI tunnel. Fires or medical emergencies on the westbound East Span are covered primarily by the Oakland Fire Department with assistance from the Emeryville Fire Department. Two Oakland fire stations and one Emeryville fire station are available to handle emergencies on the East Span.

The San Francisco Fire Department's (SFFD) Fire Station #48 on TI has primary responsibility to cover incidents on the upper deck (westbound) of the SFOBB from the tunnel to the San Francisco anchorage and on the lower deck (eastbound) from YBI to Oakland. Additional coverage is provided by two SFFD stations on mainland San Francisco which cover the lower (eastbound) deck west of and inside the YBI tunnel.

Schools

There is a school on TI which is part of the San Francisco Unified School District. It includes grades kindergarten through eighth, and over 40 percent of the students participate in programs funded by Chapter 1 to benefit children from low-income families. There is also a Federal Job Corps Culinary Training Program on TI. In Oakland, there are several private and public schools in Census Tract 4017, but the closest school is approximately 3 kilometers (2 miles) from the Oakland Touchdown. In addition, at the former Oakland Army Base, there is a child development center which will remain in operation either at its current location or at a relocated site after the base is transferred to civilian ownership.

Cultural and Recreational Facilities

There are a variety of recreation facilities on TI, including a 103-slip marina in the lagoon between TI and YBI, a fishing pier, parks, ball fields, tennis courts, and a golf driving range. There are a number of indoor recreation resources formerly operated by the Navy. The only recreation area on YBI is on USCG property, and includes a tennis court, basketball courts, and a volleyball court for use by USCG personnel.

Radio Point Beach is located north of the bridge approach and west of the SFOBB Toll Plaza at the end of Radio Road. BCDC requirements for the I-880/Cypress Freeway Replacement Project are discussed in Section 3.1.2 — Developable Land and Development Trends under "Bay Conservation and Development Commission Permit 11-93." If the permit conditions cannot be implemented, the permit allows Caltrans to pay a fee in lieu of constructing the improvements, subject to BCDC approval.

3.1.7 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by President Clinton on February 11, 1994, directs federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse impacts of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law.

The Executive Order requires each Federal agency to take the appropriate steps to identify and avoid any disproportionately high and adverse human health or environmental impacts of Federal programs, policies and activities on minority and low-income populations.

Project Area Limits. The population on YBI in the market-rate rental housing is comprised of diverse racial, ethnic, and income groups. The population is not considered a readily identifiable minority or low-income population or community.

Outside the Project Area. As noted in Section 3.1.4 — Demographic Characteristics of the Project Area and Inclusive Census Tracts, the census tracts encompassing YBI/TI and the Oakland Touchdown area contain identifiable minority and low-income communities; however, these communities are outside of the project area.

3.2 TRANSPORTATION SETTING

This section describes existing and planned transportation facilities in the project vicinity, including the local street and highway system, passenger rail and public transit facilities, bicycle and pedestrian facilities, maritime facilities, and parking facilities. Existing and projected future travel demand are also discussed.

3.2.1 Traffic

Existing Street and Highway System

The traffic study area includes I-80 between Yerba Buena Island (YBI) and the SFOBB Toll Plaza, the freeway ramps on YBI, and local streets on YBI and in the Oakland Touchdown area.

The existing San Francisco-Oakland Bay Bridge (SFOBB) is a double-deck structure. Eastbound traffic travels on the lower deck and westbound traffic travels on the upper deck. The bridge currently accommodates cars, buses, trucks, and motorcycles. There are five 3.3-meter (11-foot) travel lanes on each deck and no shoulders. The posted speed limit is 80 kph (50 mph) for both directions.

YBI is directly linked to the SFOBB by a set of freeway ramps that allow access to and from east- and westbound bridge lanes. There are six ramps, including two westbound on-ramps, one westbound off-ramp, one eastbound on-ramp, and two eastbound off-ramps. The YBI ramps are shown in Figure 3-4 in Appendix A.

On YBI, there are two main roadways: Macalla Road and Treasure Island Road. Macalla Road connects to Treasure Island Road via Southgate Road. Macalla Road also provides access to the northern part of YBI, including most of the housing and the United States Coast Guard (USCG) station. Treasure Island Road traverses the west side of YBI and provides access to Treasure Island (TI). Figure 3-5 in Appendix A shows the YBI street system.

The I-80 freeway, SFOBB Toll Plaza, and existing bridge touchdown dominate the Oakland Touchdown area. Vehicle access to the area is primarily from the distribution structure. Westbound high-occupancy vehicle (HOV) lanes extend to the north and south sides of the SFOBB Toll Plaza from I-80, I-580, and I-880. They terminate on the west side of the SFOBB Toll Plaza where HOV traffic merges with mixed-flow traffic.

Local roadways providing access to the Oakland Touchdown area include Burma Road, an extension of West Grand Avenue, and Maritime Street. These streets are located outside of the project area; however, they provide access to the Oakland Touchdown area and could potentially be affected by the project. These roadways generally have low traffic volume, but it consists of a high percentage of trucks serving the Port of Oakland and local industry. There are other roads in the area which provide access for Caltrans vehicles to the SFOBB Toll Plaza, Caltrans maintenance facility, and auto access to Radio Point Beach and the area to the south of the bridge abutment. Figure 3-6 in Appendix A shows the Oakland Touchdown area roadways,

and Figure 3-7 in Appendix A includes the streets outside of the project area that provide access to the Oakland Touchdown area.

Future Roadway Improvements

The 1996 Draft Reuse Plan for Naval Station Treasure Island (NSTI), which documents the CCSF's redevelopment proposals, includes a Draft Circulation Element for TI and YBI. Due to the limited capacity of the on- and off-ramps connecting YBI with the SFOBB, automobile access to the islands is de-emphasized in the Circulation Element. Instead, the focus is on ferry access to the islands and alternative modes of transportation for circulation on the islands such as foot, bicycle, and shuttle buses. A bus shuttle system would provide service from the TI ferry terminal to TI and YBI, along Macalla and Treasure Island Roads.

The Circulation Element also calls for minor changes in circulation on YBI. The element proposes limited improvements to emergency access. Due to the steep terrain and the threat of landslides, most of the streets on YBI, including Macalla Road, would remain in their current configuration. The SFOBB on- and off-ramps would remain in their present configuration. Treasure Island Road would remain the primary access route between the SFOBB and TI.

No major roadway changes are planned for public roadways within the Oakland Touchdown area. The reconstruction of the SFOBB Toll Plaza may include some minor access improvements to the Toll Plaza parking area.

Existing and Projected Traffic Demand

The SFOBB is the primary motor vehicle link between San Francisco and the San Francisco Peninsula and the East Bay. The westbound approaches are congested during the morning commute period, and the eastbound approaches are congested during the evening peak period. During these times, the SFOBB operates at capacity. The SFOBB is also heavily traveled during off-peak travel times. Traffic flow on the SFOBB is vulnerable to congestion due to stalls, accidents, lane closures required for bridge maintenance, and the lack of shoulders for clearing stopped vehicles. Approximately 272,000 vehicles use the SFOBB daily. In the morning peak-hour, 10,800 westbound vehicles use the SFOBB.

The freeway ramps to and from the SFOBB on YBI typically operate with no more than 200 vehicles during the peak hour. Despite low traffic volumes, the eastbound on-ramp operates at capacity in the afternoon peak hour due to severely restricted design limitations (e.g., tight curves and short merges onto the bridge).

All of the local streets in the project area (YBI, TI, and the Oakland Touchdown area) currently operate with low traffic volumes. The streets in the Oakland Touchdown area serve primarily truck traffic.

In the future, peak-hour traffic demands on the approaches to the SFOBB are expected to increase. These increases would be due to increased demand for travel between the East and West Bay Area. Traffic volumes for westbound PM peak and eastbound AM peak may increase due to possible changes in commute patterns. Also, Average

Daily Traffic (ADT) may increase due to unused capacity available during off-peak travel times. However, traffic volumes on the bridge are expected to remain fairly constant during the westbound AM peak period and the eastbound PM peak period because the bridge constrains traffic volumes.

3.2.2 Transit

Alameda-Contra Costa Transit District (AC Transit), the provider of transbay bus service, currently operates 37 transbay bus routes, totaling 654 daily bus trips, between East Bay cities and the Transbay Transit Terminal in San Francisco. Service is provided during daytime and evening hours with most service provided during morning and afternoon commute periods. Transbay buses access the SFOBB via West Grand Avenue, Maritime Street, I-580, I-80, and I-880. The buses use the HOV lanes at the SFOBB Toll Plaza. West Grand Avenue is a major access route for nine AC Transit Transbay routes. Two bus routes (one transbay, one local) also operate on Maritime Street. There are no public transit routes operating on surface streets in the Oakland Touchdown area. In 1998, AC Transit carried about 13,000 passengers across the bridge per day and between 2,100 and 3,200 in the PM peak hour.

The San Francisco Municipal Railway (Muni) provides local bus service (Route 108) between TI and the Transbay Transit Terminal in San Francisco via the SFOBB. Route 108 operates at hourly headways on weekdays and serves a bus stop at the TI gate and a bus stop on YBI for the USCG facility.

Bay Area Rapid Transit (BART) provides about 546 daily transbay trains in the corridor. BART carries about 148,900 transbay passengers per day and approximately 30,000 passengers in the two-hour peak commute period each morning and afternoon.

3.2.3 Non-Motorized Traffic: Bicycles and Pedestrians

Existing Facilities

Bicycles and pedestrians are prohibited from using the SFOBB. No bicycle or pedestrian facilities exist elsewhere within the project limits, except for a few pedestrian facilities on YBI that include sidewalks, footpaths, and stairways. Most of the roadways on the island are not designed to accommodate pedestrians and bicycles, but do not explicitly forbid non-motorized travel. The 1996 Draft Reuse Plan identifies bicycle and pedestrian travel as important future travel modes on YBI and TI. (See Figure 3-5 in Appendix A for existing streets and pedestrian facilities on YBI.)

Currently, bicyclists and pedestrians have several transit options for travel in the SFOBB corridor:

- BART operates 546 daily transbay trains. Bicycle ridership in 1997 on the entire BART system was about 700 bicyclists per day. Rules governing bicycle use on BART changed in 1998 to allow expanded use. Current ridership data are not available;

- AC Transit operates 37 transbay bus routes that provide 654 daily bus trips between the East Bay and the Transbay Transit Terminal. AC Transit intends to outfit all 700 buses in its fleet with bicycle racks. Once equipped with a bicycle rack, each bus would be able to accommodate two bicycles at a time;

- The Alameda-Oakland-San Francisco Ferry currently carries about 10 to 15 bicyclists per day during the week and higher numbers on the weekends; and

- The Caltrans bicycle shuttle transports bicyclists between the MacArthur BART station and the Transbay Transit Terminal in San Francisco. The shuttle makes four daily morning departures from Oakland and three departures from San Francisco and four San Francisco and three Oakland departures in the evening. The shuttle carries about 1,500 to 2,000 bicyclists per month.

Planned Bicycle and Pedestrian Facilities

Several bikeway and pedestrian facilities have been planned in the East Bay portion of the study area:

- A bikeway is proposed on Maritime Street as mitigation for impacts created by Port of Oakland projects. The City of Oakland is responsible for planning the facility although no completion date has been identified;

- A bikeway is proposed by the City of Oakland on Seventh Street to provide access to Portview Park, which is located at the western end of Seventh Street, adjacent to the Seventh Street Marine Container Terminal;

- A bikeway on West Grand Avenue between Maritime Street and Mandela Parkway is planned by Caltrans as part of the I-880/Cypress Freeway Replacement Project and the I-80 HOV lanes and Operational Improvement Project;

- A bikeway to be located adjacent to eastbound I-80 is required as a condition of BCDC Permit 11-93 for the I-880/Cypress Freeway Replacement Project. In concept, it would follow the Caltrans maintenance road and provide access to proposed scenic overlooks at the Oakland Touchdown area as well as connect to the Bay Trail system; and

- The Bay Trail is a regional hiking and bicycling trail planned to ring the shoreline of San Francisco and San Pablo Bays. The SFOBB and the region's other toll bridges are all designated as part of the "spine" trail of the Bay Trail.[14] The spine trail creates the backbone of the Bay Trail system, encircling and crossing the Bay and providing a continuous transportation and recreational corridor in all nine Bay Area counties. To date, slightly more than half the length of the proposed Bay Trail system has been completed. Figure 3-7 in Appendix A shows these planned improvements.

[14] Association of Bay Area Governments, *Bay Trail Plan*, Figure III-3, July 1989.

3.2.4 Maritime Traffic

Ferries

Two companies provide ferry service between the East Bay and San Francisco. The Alameda/Oakland Ferry provides 13 daily round trips from Jack London Square in Oakland to the San Francisco Ferry Building and six daily trips to Pier 39 in San Francisco. All trips make a stop at the Alameda Main Street Terminal. None of the terminals are located within the project area. The ferries pass below the SFOBB West Span on their route and do not travel through the SFOBB East Span Project area.

Harbor Bay Maritime also provides ferry service between San Francisco and the East Bay. The only East Bay stop is made at Harbor Island in Alameda, outside the project limits. These ferries pass below the SFOBB West Span on their route across the Bay to the Ferry Building in San Francisco and do not travel through the East Span Project area.

Maritime Operations

The SFOBB traverses the Central Bay Subregion of the San Francisco Bay between the cities of San Francisco and Oakland. The western portion of the Central Bay is characterized by relatively deep water, high tidal water exchange through the Golden Gate, and strong currents. This area is dominated by rocky shorelines. The eastern portion of the Central Bay is dominated by shallow mudflats.

The San Francisco Bay is used by commercial and recreational maritime traffic. The main navigation opening under the East Span of the SFOBB is located between Piers E2 and E3. It is used by commercial navigation traveling under the East Span (the main navigation opening is shown on Figure 2-9 in Appendix A). It is approximately 405 meters (1,328 feet) wide with 56 meters (184 feet) of vertical clearance above mean high water. The controlling depth in this area is 7.6 meters (25 feet). The largest commercial vessels using this waterway are tug and fuel barge combinations, derricks, dredges, tour boats, and occasionally small freighters. The USCG has established a regulated navigation area for the portion of San Francisco Bay east of YBI, precluding vessels of more than 1,450 gross tonnes (1,600 gross tons) or tugs with a tow of 1,450 gross tonnes (1,600 gross tons) or more from meeting, crossing, or overtaking a vessel of similar size. Larger commercial vessels transit beneath the SFOBB west of YBI.

Two maritime facilities are currently located within the project area. They are the Port of Oakland's Bay Bridge Terminal area and the USCG moorings on YBI. However, recent amendments to BCDC's San Francisco Bay Plan and Seaport Plan have changed land use designations in the Bay Bridge Terminal area. The "Port Priority Use" has been deleted. In addition, there is an existing pleasure/recreational craft marina on TI at Clipper Cove. The CCSF is in the process of expanding services and making improvements to Clipper Cove.

3.2.5 Truck Routes and Truck Traffic

Trucks are a major component of vehicular traffic on certain study area roadways. I-80 is a major local, regional, and interstate truck route, carrying approximately 8,430 truck trips daily on the SFOBB, or about three percent of the annual average daily traffic (AADT) volume.[15] Local streets, including Maritime Street, Burma Road, and the maintenance roads in the Oakland Touchdown area serve primarily truck traffic associated with the Port of Oakland.

3.2.6 Parking

Yerba Buena Island

One paved area used for parking is located within the project area on YBI. It is located east of Quarters 1 and can accommodate approximately 315 parking spaces. This area was formerly used for special events at the Officers' Quarters and is now controlled by Caltrans through a temporary construction easement. During construction, Navy/CCSF will need to contact and get permission from Caltrans if they would like to use it. On-street parking within the project area is difficult because the roadways are narrow; however, two designated on-street spaces are located just south of the SFOBB on Treasure Island Road. Additional on-street parking is located in the residential neighborhoods at former Navy facilities and at current USCG facilities.

Oakland Touchdown Area

In the Oakland Touchdown area, parking for SFOBB Toll Plaza and other workers currently exists in the median area between the westbound and eastbound lanes of I-80. Other land uses in the touchdown area have "informal" parking areas because the land is open and flat. In addition, under BCDC Permit 11-93, Caltrans is required to provide six parking spaces on the south side of the Oakland Touchdown for use by visitors to the view lookout areas.

3.2.7 Federal Aviation Administration

The existing and proposed SFOBB structures are required to conform to Federal Aviation Administration (FAA) Regulations Part 77, "Objects Affecting Navigable Airspace." The conformance requires both obstruction marking and lighting in accordance with FAA Advisory Circular AC70/7460 effective January 1, 1996.

3.2.8 United States Coast Guard

The existing and proposed SFOBB structures are required to conform to USCG Regulations Parts 114 and 115 of Title 33, Code of Federal Regulations. Conformance with these regulations requires that marine navigation channels remain navigable during and after construction. The appropriate levels of lighting and obstruction markings are required to identify permanent and temporary bridge structures.

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[15] Caltrans, *1998 Traffic Volumes on the California State Highway System*, April 2000.

3.3 VISUAL SETTING

As described below, the visual setting was evaluated from 20 viewpoints around the Bay Area and within each of the distinct landscape units which make up the study area. For more information on this visual assessment, the Visual Impact Assessment technical report is available at the locations listed in the Preface of this document. The Visual Impact Assessment technical report includes a CD-ROM with photographs, simulated drive-throughs, and an interactive map of visual simulations. Since publication of the Visual Impact Assessment, three additional viewpoints have been added to the visual analysis in response to agency comments. As a result, the three additional viewpoints are discussed in this EIS (see Figures 4-15a through 4-17c in Appendix A), but not included in the Visual Impact Assessment technical report.

3.3.1 Existing Visual Character and Context

Regional Landscape and Scenic Resources

The Bay Area is one of the most scenic areas of the world, combining water, islands, urban skylines, bridges, and mountains into picturesque and impressive vistas. Seven different bridges span the Bay, each one constituting a significant scenic resource in its own right. The Golden Gate Bridge is known around the world for its grace and beauty. However, all seven bridges, including the San Francisco-Oakland Bay Bridge (SFOBB), the Richmond-San Rafael Bridge, the San Mateo-Hayward Bridge, and the Dumbarton Bridge, span significant stretches of open water and are highly visible from vantage points around the Bay. San Francisco Bay extends over 97 kilometers (60 miles) from the Sacramento River Delta to the marshlands of Santa Clara County, a total of more than 1,000 square kilometers (386 square miles). The Bay is a rich marine resource providing navigable waterways for commerce and habitat for countless species.

The cities of Oakland and San Francisco are located across the Bay from one another, roughly midway between the northern and southern ends of the Bay. For viewers both on and off the water, the area between these two cities is particularly scenic. Four major islands (Alcatraz, Angel, Treasure, and Yerba Buena) are found in this region: Mt. Tamalpais and the hills of Marin County tower to the northwest; the East Bay hills of Oakland and Berkeley rise dramatically to the east; and the skylines of Oakland and San Francisco complement the area's natural beauty. The preservation of the aesthetic quality of this region is of particular importance to decision-makers and the millions of people who live in and visit the Bay Area each year.

Context of the East Span within the Bay Area

Along with the Golden Gate Bridge, the SFOBB is one of the Bay Area's most prominent man-made features. See Figure 3-8 in Appendix A for visual context.

The SFOBB East Span is a highly visible structure that can be seen from cities on the west side of the Bay (San Francisco, Sausalito) as well as from cities in the East Bay (including Alameda, Oakland, Berkeley, Emeryville, Albany, El Cerrito, and Richmond). For eastbound motorists, the SFOBB East Span is the gateway to Oakland and the East Bay. While motorists traveling in this direction on the existing East Span have views of

the City and Port of Oakland to the south and the hills behind the communities of Berkeley and Emeryville to the north, these views are highly obstructed by the upper deck of the bridge and the steel trusses which line the bridge.

3.3.2 Existing Landscape Units and Visual Image Types

The study area has been subdivided into "landscape units" to facilitate its description and analysis of the project. Landscape units are geographically distinct portions of the study area which have a particular visual character. In the study area, the five landscape units identified are Yerba Buena Island (YBI), the main span (cantilever section) of the existing East Span, the incline section of the East Span, the Oakland Touchdown area, and the SFOBB Toll Plaza. The boundaries of each landscape unit are shown in Figure 3-9 in Appendix A and described in Table 3.3-1. Figure 3-10a in Appendix A includes representative photographs of the landscape units.

Each landscape unit has a certain visual character based upon the land uses that comprise it. These smaller scale land uses and landforms within each landscape unit are called "visual image types." Visual image types are areas that exhibit a fairly homogeneous visual quality. The visual image types are depicted in Figures 3-10b and 3-10c in Appendix A.

Table 3.3-1 Landscape Units

Landscape Unit	Description
Yerba Buena Island (YBI)	• 57 ha (142 acres) in size, 103 m (338 ft) maximum elevation above mean sea level. • Visually, the island appears to be largely undeveloped: steep, wooded hillsides leading down to the shoreline. The existing East Span is the island's most prominent manmade feature. • Structures visible from the SFOBB East Span: USCG facilities, the observation tower, and tunnel portal. • Visual image types present on the island include residential, industrial, military, historic, and open space.
The Main Span (Cantilever Section)	• 1.6 km (1 mile) long, up to 61 m (200 ft) above mean sea level. • Composed of steel beams, grayish-silver in color, which form a zigzag pattern along either side of the roadway between the upper and lower decks. • Fashioned in a style reminiscent of a train trestle. Includes a 737-meter (2,418-foot) cantilever truss adjacent to YBI, five high truss spans of slightly more than 152 meters (500 feet) each. • Visual image types present include open space (Bay) and historic (the bridge).

Table 3.3-1 Landscape Units (Continued)

Landscape Unit	Description
The Incline Section	• 1.7 km long (1.1 miles), rising from mean sea level to meet the cantilever section at 61 m (200 ft) above mean sea level. • Connects the cantilever section of the SFOBB East Span to the Oakland Touchdown area. • Composed of steel beams, grayish-silver in color which form a zigzag pattern along either side of the roadway between the upper and lower decks. • Visual image types present include open space (Bay) and historic (the bridge).
Oakland Touchdown	• 1.6 km (1 mile) from the SFOBB Toll Plaza to where the East Span begins its incline. • Area is flat and rises only a few meters above sea level. • On the north side of the touchdown is an open area adjacent to the mudflats of the Emeryville Crescent. This area harbors several pine trees and low marshland vegetation. • On the south side of the span, industrial uses, including open storage, the EBMUD dechlorination facility, and two maintenance buildings, one once part of the historic Key System, are located at the extreme western end of the touchdown. An undeveloped area owned by the U.S. Army exists along the shoreline at the southern edge of the touchdown area. • Visual image types include industrial, historic, and open space.
SFOBB Toll Plaza	• Ground level, encompassing 15 lanes of westbound traffic. • Entirely man-altered with broad expanses of asphalt where vehicles queue to pay tolls and six lanes of eastbound traffic continuing off the bridge toward the network of highways in the East Bay. • Main Bridge Administration Building is located at the SFOBB Toll Plaza, along with a series of Caltrans maintenance and repair buildings which support the operation and maintenance of the SFOBB. • Visual image types in this landscape unit consist of military and industrial.

Source: Visual Impact Assessment, September 1998.

3.3.3 Viewer Groups and Viewpoints

Viewer groups include those viewers who can expect to see views *from* the bridge and those who can expect to see views *to* the bridge. Viewer groups are defined as those viewers most likely to share similar exposure to and expectations of their view from and to the SFOBB East Span.

Views from the Bridge

Views from the bridge are seen from motor vehicles. Viewer groups include commuters, recreational users, and commercial users.

Commuters. The flow of commuting traffic is primarily westbound (to San Francisco) during the morning period and primarily eastbound (to Oakland and surrounding communities) in the afternoon period.

Westbound traffic on the SFOBB rides on the upper deck of the bridge. Westbound views are partially obstructed by the architecture of the bridge itself, most noticeably by the presence of a 1.2-meter (4-foot) high solid railing that runs along either side of

the roadway. The construction style includes steel beams that reach from the upper deck into the cantilever structure at regular intervals, partially obstructing views from automobiles. Nevertheless, commuters have several dramatic views, including the skyline of San Francisco and the Marin Headlands, as they proceed westward.

Eastbound traffic on the SFOBB rides on the lower deck of the span. Views from the lower deck are significantly obstructed for three reasons: the presence of the westbound roadway above, the presence of a 1.2-meter (4-foot) high solid railing that lines either side of the lower span, and the presence of steel beams that span from the upper to lower deck at regular intervals. For motorists commuting in sport utility vehicles, buses, and other vehicles with a higher passenger compartment, visibility is less compromised by the solid railing and the architecture of the bridge.

Recreational Users. Recreational users of the bridge include tourists enjoying the scenery of the Bay, outdoor enthusiasts traveling to points eastward from San Francisco, and people making their way to events or gatherings outside of their working environment. All recreational users are in vehicles as there are no bicycle or pedestrian facilities on the SFOBB.

Commercial Users. Commercial users include truck drivers, delivery personnel, bus drivers, and other people involved in day-to-day commerce in the Bay Area. Commercial users might make several trips across the bridge on a daily basis. Commercial users would tend to ride in vehicles with a higher passenger compartment and so would enjoy greater visibility from the bridge.

Views to the Bridge

The viewers' experience of the bridge varies considerably based upon their location, the duration of their view, and the frequency with which they are exposed to views of the bridge. To provide a representative sample of what changes viewers across the San Francisco Bay Area would experience in their viewshed as a result of construction of a new bridge, a cross section of viewers and viewpoints was chosen. Please see Figures 4-5 through 4-15 in Appendix A for photographs of views toward the East Span.

Viewer Groups. Viewer groups identified in this section include commuters, ferry passengers, residents and workers, and recreational users/tourists.

Commuters with views to the East Span exist on both sides of the Bay. Commuters traveling on the interstate highway system in the East Bay on sections of I-80 westbound and I-880 northbound have particularly clear views and would be most sensitive to changes to the East Span.

Ferry passengers primarily include commuters between various points in the East and North Bay and San Francisco. Ferry passengers view the East Span from the Bay surface.

Residential viewers and workers exist on both sides of the Bay. Views vary greatly within this group, based on proximity, view obstruction, and the location and elevation

of the residence/workplace. Residents and workers with clear, unobstructed views would be most sensitive to changes to the East Span. In the East Bay, potential viewers may live/work in Oakland, Emeryville, Berkeley, Albany, El Cerrito, Richmond, or San Leandro. In the West Bay, potential viewers may live/work in San Francisco, Sausalito, Tiburon, or elsewhere in Marin County.

Recreational users and tourists have abundant opportunities to view the East Span from all around the Bay Area. Activities such as boating, kayaking, windsurfing, and fishing make use of the Bay itself, while activities such as sightseeing, hiking, and walking often incorporate a view of the Bay. These users would typically be very sensitive to changes to the East Span.

Existing Visual Quality. Representative viewpoints were identified and were used to simulate the proposed project alternatives. This was done to assist in the analysis and documentation of visual resource changes. The location of these viewpoints within the Bay Area is depicted in Figure 3-11 in Appendix A. Potential viewpoints were chosen on the basis of a variety of factors, including high visibility/close proximity to sensitive viewers, specific views or types of views identified as important by the public, representative of specific viewers or viewer groups, and range of view types available to the public (close proximity to long-distance views).

The existing visual quality for each of the viewpoints identified was evaluated using an approach to scenic quality evaluation that looks for indicators of the level of visual relationships rather than on a judgment of physical landscape components. This approach provides a set of three evaluative criteria developed under the sponsorship of the FHWA in previous visual impact studies: vividness, intactness, and unity.

These criteria are defined as follows:

- **Vividness** is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns. An example within the study area is the view of the Bay and San Francisco skyline seen from the upper deck of the existing Bay Bridge;

- **Intactness** is the visual integrity of the natural and man-built landscape of the immediate environs and its freedom from encroaching elements. An example of lack of intactness within the study area is the patchwork of industrial uses on the Oakland Touchdown; and

- **Unity** is the visual coherence and compositional harmony of the viewshed. The viewshed includes all natural and man-made features found within the normal view range. In man-altered landscapes, it frequently attests to the careful design or fit of individual components in the landscape. An example is the way man-made elements such as the Golden Gate Bridge combine with natural features such as San Francisco Bay to provide a coherent image unique to the Bay Area.

The results of this analysis of existing visual quality are summarized in Table 3.3-2.

Table 3.3-2 Summary of Existing Visual Quality

Viewpoint	Setting	Vividness	Intactness	Unity
Richmond Marina	9.6 km (6 mi.) north of span. Coastal. Sea level.	Moderate-to-high	Moderate-to-high	Moderate-to-high
Berkeley Pier	4.8 km (3 mi.) northeast of span. Coastal. Sea level.	High	High	Moderate
The Claremont Hotel	8.0 (5 mi.) kilometers northeast of span. Inland. Elevated.	Low	Low-to-moderate	High
I-80 between University Ave. and Ashby Ave.	4.0 km (2.5 mi.) northeast of span (moving southbound). Inland. Sea level.	Moderate	Low-to-moderate	Low-to-moderate
Emeryville Marina	2.5 km (1.6 mi.) northeast of span. Coastal. Sea level.	Moderate	Moderate	Moderate-to-high
Oakland Touchdown Area	60 m (200 ft.) south of span. Coastal. Sea level.	High	High	High
I-880 Approaching the SFOBB	9.8 km (6 mi.) east of span at closest point (moving). Inland. Elevated.	Moderate	Low-to-moderate	Low-to-moderate
Oakland Federal Building	5.6 km (3.5 mi.) southeast of the span. Inland. Elevated.	Low-to-moderate	Moderate	Moderate-to-high
Alameda Naval Air Station	4.0 km (2.5 mi.) south of span. Inland. Sea level.	Moderate-to-high	Moderate	Moderate
Oakland-San Francisco Ferry	As close as 0.8 km (0.5 mi.) south of span (moving west-east). In the Bay. Sea level.	High	High	High
Hunters Point	10.0 km (6.3 mi.) southwest of span. Coastal. Sea level.	Moderate	Moderate-to-high	High
Potrero Hill	7.0 km (4.4 mi.) southwest of span. Inland. Elevated.	Moderate	Moderate	Moderate-to-high
Pier 39	5.0 km (3 mi.) west of span. Coastal. Sea level.	Low-to-moderate	Moderate-to-high	Moderate
Treasure Island–Viewpoint 1	0.8 km (0.5 mi.) northwest of span. Coastal. Sea level.	High	High	Moderate-to-high
Treasure Island–Viewpoint 2[a]	0.8 km (0.5 mi.) north of span. Coastal. Sea level.	High	High	Moderate-to-high
Sausalito	12.0 km (7.5 mi.) northwest of the span. Coastal. Sea level.	Moderate	Moderate-to-high	High
Angel Island	7.2 km (4.5 mi.) northwest of span. Inland. Elevated.	Moderate-to-high	Moderate	High
Vallejo-San Francisco Ferry	As close as 2.5 km (1.6 mi.) northwest of span (moving south-north). In the Bay. Sea level.	High	Moderate-to-high	High
Nimitz House, YBI[a]	Within 100 meters (328 feet) north and west of the span. The span is approximately 30 meters (98 feet) above the viewpoint.	High	Low	Low
Yerba Buena[a]	74 meters (250 feet) north of span. Forest. Historic buildings. Sea level.	High	Moderate-to-low	Moderate-to-low

Source: Visual Impact Assessment, September 1998.
[a]These viewpoints added after completion of the Visual Impact Assessment.

3.4 AIR QUALITY

The impacts of air pollution on health and other aspects of the quality of life are considered harmful by regulatory agencies such as the U.S. Environmental Protection Agency (EPA). Several federal, state, and local regulations and programs exist to protect and improve air quality in the Bay Area.

3.4.1 Regulatory Context

Federal Regulations

Pursuant to the federal Clean Air Act of 1970 and its subsequent amendments, the EPA established ambient air pollutant concentration standards and maximum allowable emission rates for certain individual sources of air pollutants. EPA made each state responsible for attaining ambient air quality standards—National Ambient Air Quality Standards (NAAQS)—within its borders. A State Implementation Plan (SIP) must be prepared that demonstrates how each state will attain the NAAQS.

NAAQS have been established for seven criteria air pollutants: ozone, carbon monoxide, particulate matter with an aerodynamic diameter less than ten micrometers (PM_{10}), particulate matter with an aerodynamic diameter less than 2.5 micrometers ($PM_{2.5}$), nitrogen oxides, lead, and sulfur dioxide. Primary standards for air pollutants were established to protect public health, while secondary standards were established to protect the public welfare by preventing impairment of visibility and damage to vegetation and property. The federal primary standards are listed in Table 3.4-1. The table also summarizes the attainment status for each criteria pollutant regulated by the EPA.

On the federal level, the Bay Area has been designated as an attainment (meeting standards) or unclassified (i.e., available data do not support a designation of non-attainment or attainment) area for all pollutants, except ozone. In June 1998, the EPA re-designated the Bay Area as non-attainment area for ozone because the area had 11 violations in 1995 and six violations in 1996. The Bay Area Air Quality Management District (BAAQMD), the local agency in charge of controlling air pollution and attaining air quality standards in the Bay Area, developed an Ozone Attainment Plan, which was adopted in June 1999. The EPA has indicated that the 1999 Ozone Attainment Plan is inadequate. As a result, the Metropolitan Transportation Commission (MTC), the Air Resources Board, and the BAAQMD are preparing a revised Ozone Attainment Plan for submittal to EPA by July 2001. The BAAQMD hopes to achieve attainment by 2003.

Under the Clean Air Act, regions that are maintenance areas (i.e., geographic areas that were previously designated non-attainment areas, but now meet the applicable standard) still must demonstrate how they will maintain compliance with the standard. The BAAQMD has prepared a Carbon Monoxide Maintenance Plan that includes information on control measures that will be used to keep the Bay Area in attainment for at least the next ten years.

In addition to other SIP and Air Quality Plan activities, federal agencies must also make a determination of conformity with the SIP before taking any action on a proposed

Table 3.4-1 State and Federal Air Quality Standards

		California Standards		National Standards	
Pollutant	**Averaging Time**	**Concentration**	**Bay Area Attainment Status[a]**	**Concentration**	**Bay Area Attainment Status**
Ozone	1-hour	0.09 ppm (180 µg/m^3)	N	0.12 ppm (235 µg/m^3)	N[b]
	8-hour[c]	---	---	0.08 ppm (157 µg/m^3)	U
Carbon Monoxide	8-hour	9.0 ppm (10 mg/m^3)	A	9 ppm (10 mg/m^3	A
	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	A
Nitrogen Dioxide	Annual Average	---	---	0.053 ppm (100 µg/m^3)	A
	1-hour	0.25 ppm (470 µg/m^3)	A	---	---
Sulfur Dioxide	Annual Average	---	---	80 µg/m^3 (0.03 ppm)	A
	24-hour	0.04 ppm (105 µg/m^3)	A	365 µg/m^3 (0.14 ppm)	A
	1-hour	0.25 ppm (655 µg/m^3)	A	---	---
Suspended Particulate Matter (PM_{10})	Annual Arithmetic Mean	---	---	50 µg/m^3	A
	Annual Geometric Mean	30 µg/m^3	N	---	---
	24-hour	50 µg/m^3	N	150 µg/m^3	U
Suspended Particulate Matter ($PM_{2.5}$)[c]	Annual Arithmetic Mean	---	---	15 µg/m^3	U
	24-hour	---	---	65 µg/m^3	U
Lead	Calendar Quarter	---	---	1.5 µg/m^3	A
	30-Day Average	1.5 µg/m^3	A	---	---

Source: California Air Resources Board, Proposed Amendments to the Area Designations for State Ambient Air Quality Standards and Proposed Maps of the Area Designations for the State and National Ambient Air Quality Standards, October 1999.

Notes:

[a] A = Attainment. N = Non-attainment. U = Unclassified.

[b] The Bay Area was re-designated as non-attainment for ozone in June 1998.

[c] The 8-hour ozone and $PM_{2.5}$ standards were struck down by a federal court in May of 1999. EPA will appeal.

project located in a non-attainment or maintenance area. In 1993, EPA published the General Conformity Rule that indicates how federal agencies are to make such a determination. A similar rule was created to specifically address conformity issues related to highway or transit projects that receive funding or approval from FHWA or the Federal Transit Administration (FTA). The most recent version of the Transportation Conformity Rule is July 1997. In general, transportation projects must not cause or contribute to new violations of air quality standards, worsen existing violations, or interfere with timely attainment of standards. Regional transportation plans (RTPs) and transportation improvement programs (TIPs) must conform to the SIP. Individual projects must come from a conforming RTP and TIP, be included in the regional emissions analysis for the RTP and TIP, or be included in a newly performed regional analysis.

Projects must also be analyzed for their localized air quality impacts in PM_{10} and carbon monoxide non-attainment or maintenance areas. Guidance for performing PM_{10} analyses is not yet available.

State Regulations

The California Air Resources Board (CARB) coordinates and oversees the activities of California's many local air quality agencies. The CARB is also responsible for incorporating local non-attainment plans into the SIP. The CARB has established state ambient air quality standards, many of which are more stringent than the corresponding NAAQS (see Table 3.4-1 for a comparison of the standards). The CARB and the local air quality agencies operate numerous air quality monitoring stations throughout the state. Data collected at these stations are used to classify areas and air basins as attainment or non-attainment for each criteria air pollutant based on whether the federal and state standards have been achieved.

The California Clean Air Act (CCAA), which became effective on January 1, 1989, provides a planning framework for attainment of California Air Quality Standards. Local air quality agencies in violation of state ambient air quality standards are required to prepare plans for attaining the state standards.

The San Francisco Bay Area has been classified by the CARB as a serious state non-attainment area for ozone. The Bay Area 1994 Clean Air Plan included a comprehensive strategy to reduce ground-level ozone in the Bay Area. This plan was updated in 1997. The Bay Area 1997 Clean Air Plan includes changes in the organization and scheduling of some of the 1994 Clean Air Plan control measures and also includes 12 new stationary and mobile source control measures, as well as two new transportation control measures.

The Bay Area also does not attain state PM_{10} ambient air quality standards, but attainment programs for PM_{10} are not yet required. The California Legislature, when it passed the California Clean Air Act in 1988, recognized that PM_{10} attainment could not be easily obtained. The CCAA did require the CARB to produce a report regarding the prospect of achieving the state ambient air quality standard for PM_{10}. The CARB recommended that certain actions be taken, but did not impose a planning process to require attainment by a certain date.

3.4.2 Meteorology and Topography

The primary factors affecting local air quality are the locations of air pollutant sources and the amounts of pollutants emitted, but meteorological and topographical conditions also are important. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Another important factor is the Pacific Ocean, which moderates temperatures and helps create consistent wind gradients.

The San Francisco Bay Area has complex terrain, relatively strong prevailing winds because of its proximity to the Pacific Ocean, and strong temperature gradients between the coast and inland areas. Consequently, the Bay Area has low potential for accumulation of pollutants near the coast and high potential in sheltered inland valleys. The project is in an area where pollution potential is very low due largely to good ventilation and less influx of pollutants from upwind sources. However, on occasion, the area does experience warm temperatures, calm winds, and pollutant stagnation.

3.4.3 Existing Project Area Air Quality

Monitoring data in the project area are limited. The criteria pollutant monitoring stations closest to the project site are located on Alice Street (near Jack London Square) in Oakland and at the county hospital in San Leandro. Monitored values at these stations may be slightly higher than actual concentrations in the project area, since there are so few pollutant sources near the SFOBB. The Alice Street station measures ozone and carbon monoxide and the San Leandro station measures for ozone and PM_{10}. Table 3.4-2 summarizes recent monitoring data from these two stations[16].

The monitoring data for 1995 through 1998 show that the area occasionally violates state ozone and 24-hour PM_{10} standards and, even more rarely, exceeds the federal ozone standard. The Oakland station monitored only one state ozone violation during the four years examined. During the same four years, the San Leandro station had 13 violations of the state ozone standard and three violations of the federal standard. The California 24-hour PM_{10} standard was exceeded twice. All other pollutant levels were below federal and state standards.

[16] California Air Resources Board, *Summary of Air Quality Data* for each of the years 1995, 1996, 1997, and 1998, published in 1996, 1997, 1998, and 1999, respectively.

Table 3.4-2 Air Pollutant Data Summary (1995-1998)

		Year			
		1995	1996	1997	1998
Pollutant	**Averaging Time**	Concentration (ppm)	Concentration (ppm)	Concentration (ppm)	Concentration (ppm)
Ozone	1-hour (O)[a]	0.11[c]	0.09	0.08	0.06
	(SL)[a]	0.15	0.11	0.11	0.11
Carbon Monoxide	8-hour (O)	3.9	3.9	3.6	4.6
	1-hour (O)	5.0	7.0	8.0	6.0
Suspended Particulate Matter (PM_{10})[b]	Annual Arithmetic Mean (SL)	19.5	21.3	17.4	14.0
	Annual Geometric Mean (SL)	16.9	19.1	15.9	13.2
	24-hour (SL)	47	59	65	32

Source: California Air Resources Board (1996, 1997, 1998, and 1999)

[a] (O) = Oakland Alice Street monitoring station.
(SL) = San Leandro County Hospital monitoring station.

[b] Units of measurement for PM_{10} are $\mu g/m^3$ (micrograms per cubic meter).

[c] Underline indicates exceedance of standard.

3.5 NOISE AND VIBRATION

This section describes the affected environment for noise and vibration. It discusses how noise and vibration are measured and reported, criteria for assessing noise levels, and measured and modeled noise and vibration levels at Yerba Buena Island (YBI), Treasure Island (TI), and along the Oakland shoreline. A detailed Noise and Vibration Study technical report has been prepared and is available for review at the locations indicated in the Preface.

3.5.1 Noise

Perception of Noise and Noise Descriptors

A number of factors affect sound as it is perceived by the human ear. These include the actual level of sound (or noise), the frequencies involved, the period of exposure to the noise, the changes or fluctuations in the noise levels during exposure, and meteorological conditions (wind speed, direction, inversions, humidity, etc.). Levels of noise are measured in units called decibels (dB). Since the human ear cannot perceive all pitches or frequencies equally well, measured sound levels are adjusted or weighted to correspond to human hearing. This adjusted unit is known as the "A-weighted" decibel. All references to noise in this report refer to A-weighted decibel levels, or dBA. A few examples of dBA noise levels are 40 dBA (typical of quiet urban nighttime), 88 dBA (typical of a diesel truck passing by at 15 meters [50 feet]), and 105 dBA (typical of a jet flying over at 305 meters [1,000 feet]).

Very few noises are constant. Most fluctuate in decibel level over short periods of time. One way of describing fluctuating sound is to report the fluctuating noise heard over a specific time period as if it had been a steady, unchanging sound. For this, a descriptor called the Equivalent Sound Level, L_{eq}, is computed. L_{eq} is the constant sound level (A-weighted) that, for a given situation and period (e.g., 1-hour L_{eq} or 24-hour L_{eq}), conveys the same sound energy as the actual time-varying sound. The 1-hour L_{eq} during the noisiest hour is often used to determine if a traffic noise impact exists and to determine abatement measures for roadway noise, while 24-hour cumulative L_{eq} averaging methods are used to evaluate typical noise exposure in an area.

Traffic Noise

Roadway noise is dependent on many factors: vehicle type and speed, number of vehicles, roadway surface and gradient, distance from the roadway to the receiver, ground surface (whether hard or soft), and shielding due to structures, soundwalls, hills, the edge of a roadway, and earth berms between a receiver and the road. For example, increases in vehicle speed and/or traffic will increase the noise level.

Roadway surface and gradient will also affect traffic noise. Noise from rough and potholed surfaces can be three to four dBA higher than smooth seal-coated surfaces. A steeper road gradient will primarily affect the level of truck traffic noise. The SFOBB generates higher noise levels than a typical roadway, due to the reverberation of sound and vibration within the bridge structure, and the reflection of noise from the upper deck.

Evaluating Noise Levels

Noise impacts from operation of a roadway usually assessed by evaluating the total predicted noise level and evaluating differences between the existing and future noise environments. When evaluating operational noise increases in the environment, the following relationships to quantifiable increases are used as a basis for assessing impacts:

- Except during carefully controlled laboratory conditions, a change of 1 dBA is very difficult to perceive;
- In the outside environment, a 3 dBA change is considered barely noticeable;
- An increase of 5 dBA is readily perceived as "louder" and is generally required before a change in community response would be expected;
- A 10 dBA increase is perceived as a doubling of noise; and
- Caltrans defines an increase of 12 dBA as a "substantial increase."

3.5.2 Land Uses and Noise- and Vibration-sensitive Receptors

Although the majority of the project area is located over Bay waters, the existing and proposed bridge alternatives cross or are near a variety of existing and future land uses, with varying degrees of noise and vibration sensitivity. These are briefly summarized below.

Yerba Buena Island

The U.S. Navy (Navy) and the U.S. Coast Guard (USCG) have former and existing residential units on YBI. These include the Navy's residential Quarters 1 through 7, apartment buildings containing about 105 housing units, and the USCG's enlisted and officers' quarters. The USCG also maintains various offices, maintenance and repair facilities, and outdoor tennis, basketball, and volleyball courts. These existing uses are currently exposed to noise from the existing bridge traffic. Conceptual plans for YBI outlined in the 1996 Draft Reuse Plan anticipate use of the area by the City and County of San Francisco (CCSF) for residential uses, visitor-serving attractions, conference facilities, and open space. The USCG proposes to continue existing uses.

Treasure Island

The northwestern portion of TI was developed for residential uses and includes recreational facilities such as ball fields, tennis courts, a golf driving range, and picnic areas. The eastern and southern portions of the island include administrative uses, and two of the buildings are currently used for film production. There is an existing recreational marina. Future land use plans outlined in the 1996 Draft Reuse Plan, while not defined in great detail to date, include entertainment and visitor attraction facilities; film production and industrial use facilities; hotel, resort, and conference center uses; and potential residential and research and development uses.

Oakland Touchdown Area

This location currently has no noise-sensitive activities or uses. Currently, there are no formal public access facilities to the shoreline, although the area is used informally for fishing and shoreline viewing. The City of Oakland and the East Bay Regional Park District (EBRPD) are planning the Gateway Park and public access facilities on the south side of the Oakland Touchdown. In addition, public access, in the form of bicycle and pedestrian access and viewing areas, is required in this area as a result of previous Caltrans project commitments under BCDC Permit 11-93.

3.5.3 Noise Abatement Criteria and Analysis Guidelines

Federal Highway Administration (FHWA) Noise Abatement Criteria (NAC) for various land use ratings (called activity categories) are given in Table 3.5-1. These noise criteria are assigned to both exterior and interior activities. Noise attenuation provided by most residential structures leads to compliance with the interior NAC if the exterior criterion is attained.[17]

Table 3.5-1 Federal Noise Abatement Criteria, Hourly A-Weighted Sound Level - Decibels (dBA)[a]

Activity Category	$L_{eq}^{(h)}$	$L_{10}^{(h)}$	Description of Activity Category
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Federal Highway Administration, 1982.
[a] Either $L_{10}^{(h)}$ or $L_{eq}^{(h)}$, but not both, may be used on a project.

Land uses in the vicinity of the Oakland Touchdown area include industrial and port-related sites, open space, wildlife habitat, and a future public shoreline park. There are

[17] Federal Highway Administration, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, 1982.

currently no formal public access or recreation areas, so the land uses have been classified as Activity Category C. At YBI, land uses include residences, government offices and buildings, currently unused buildings, and open space. Land uses on YBI are classified as Category B, except the government offices and buildings which are Category C. Commercial uses are present on TI and are classified as Category C. These land uses and exterior NAC correspond to the following FHWA activity categories (exterior uses), according to Table 3.5-1:

- Category B (67 dBA) - Residences, parks, and recreation areas;
- Category C (72 dBA) - Developed lands not included in Category B; and
- Category D (No NAC) - Undeveloped lands.

As described in more detail in Section 4.5 — Noise and Vibration, if these sound levels are predicted to be approached (one dBA below the criteria) or exceeded during the noisiest one-hour period, or if the project will result in a substantial (12 decibels or greater) noise increase, noise abatement measures are to be considered and, if found reasonable and feasible, they are incorporated in the project. A first step in the determination of whether future noise levels will approach or exceed the criteria is to measure noise levels and use this data to establish baseline conditions and calibrate the noise model.

3.5.4 Noise and Vibration Measurements, Model Calibration, and Noise Modeling

The existing noise environment was characterized through the evaluation of field noise measurements. Long-term measurements (at least 24 hours) were made at representative locations (see Figures 3-12 through 3-14 in Appendix A). These locations included the Navy Senior Officers' Quarters Historic District Building 240, the USCG officers' quarters, and USCG Bachelor Enlisted Quarters. A long-term measurement was also made on the north side of the bridge at the Oakland Touchdown area. Thirty-eight short-term measurements (approximately 15 minutes long) were also made at representative locations and land uses. These included residential locations, the USCG administrative offices, Building 262, the film studios on TI, and the location of the proposed Oakland Touchdown park. The short-term and long-term measurements were used to calibrate the noise model, providing more accurate modeling of existing and future noise levels generated by traffic.

Future peak-hour noise levels were predicted using the "Sound32" noise model. This model is based on the FHWA noise prediction model STAMINA and uses California Vehicle Noise Emission Levels. Traffic data were developed for the model based on volumes and speed scenarios that would create the loudest hourly peak noise levels. Each scenario was tested, and the "worst-case" traffic speed and volume condition (i.e., 1,600 vehicles per lane per hour traveling at 97 kilometers [60 miles] per hour) was selected for further modeling that created the maximum predicted noise conditions.

Measurements of existing vibration were made at five locations: two on YBI (on the base of a bridge support column [Bent YB3] south of Building 213 and at a point approximately 30 meters [100 feet] north of the bridge column support) and three on TI (4 meters [13 feet] from the shoreline; approximately 23 meters [76 feet] from the film studios on a concrete pillar used as a foundation for metal lattice which appears to have supported a sun/rain cover; and on a large steel manhole cover about 23 meters [76 feet] south of the film studios).

3.5.5 Existing Noise Levels

Generally, the field measurements indicated noise levels in excess of 66 dBA L_{eq} along and near most of the project route. Based on the measured noise levels, noise modeling was performed to predict the highest noise period and level for the peak-noise-hour traffic conditions for the existing bridge. The following is a summary of the results by geographical area. Table 3.5-2 summarizes the results of the long-term (24-hour) noise measurements. Table 3.5-3 lists the measured short-term (generally 10 to 15 minutes in duration) noise levels, while modeled noise levels for the existing bridge and setting are shown in Table 3.5-4. The data in Table 3.5-4 represent the traffic noise during the peak-noise hour using Level-of-Service C-D traffic volumes and speeds (1,600 vehicles per hour per lane traveling at 97 kilometers [60 miles] per hour). The locations of measured and modeled receptors are shown in Figures 3-12 through 3-14 in Appendix A.

Yerba Buena Island

All of the noise measurements conducted on YBI approached or exceeded the FHWA NAC for Activity Category B (residences, parks, recreation areas) of 67 dBA L_{eq}, with the exception of the noise measurements taken at the USCG Officers' Quarters (Quarters A, B, and C), located south of the bridge and west of the existing Coast Guard station. At that location, noise levels ranged from 60 dBA L_{eq} to 62 dBA L_{eq}. Elsewhere, noise levels ranged from 66 dBA L_{eq} to 74 dBA L_{eq}. These noise levels were verified by repeating the measurement one or more times at selected locations. 24-hour noise measurements at YBI ranged from 59 dBA (24-hour L_{eq}) at Location 5 to 72 dBA (24-hour L_{eq}) at Location 1.

Consistent with the measurements, the noise modeling also showed existing peak noise levels that would exceed the NAC for residential locations (Table 3.5-4). Non-residential land uses, such as the USCG administrative complex, have a NAC of 72 dBA (for Category C land uses). The existing peak-noise-hour level at Location 7 was modeled at 69 to 71 dBA and thus would approach the criteria under worst-case conditions.

The measured and modeled noise levels are primarily generated by traffic on the existing bridge structure. Specifically, the stacked configuration of the bridge causes traffic noise from the lower deck to be reflected from the upper deck underside, and traffic noise components from both the upper and lower decks are also transmitted downward. The expansion joints in the existing bridge structure were observed to cause additional noise as traffic passes over them, because of discontinuities with the roadway surface. Vibration is carried by the joints through the steel superstructure, resulting in the whole structure vibrating and causing noise.

Treasure Island

A noise measurement was conducted in the parking lot of a film studio located on TI (see Figure 3-13 in Appendix A). This site overlooks the East Span, which is approximately 760 meters (2,500 feet) south of the studio. The measured noise level was 62 dBA L_{eq} at this location, and the noise model indicated the peak-noise-hour level to be 67 dBA L_{eq}. These levels are below the NAC for Activity Category C of 72 dBA L_{eq}.

Oakland Touchdown Area

Measured noise levels in the vicinity of the Oakland Touchdown area ranged from 64 to 71 dBA L_{eq}. Modeling of peak-noise-hour traffic conditions indicated levels of 65 to 74 dBA with five of the noise receptors modeled (noise receptors 12-M2, 12-LT, 13A, 13C, and 3-M1 in Table 3.5-4) exceeding the NAC for Activity Category C (the prevalent land use in this area, along with Activity Category D) of 72 dBA L_{eq}. A 24-hour noise measurement conducted at Location 12 resulted in a 24-hour L_{eq} of 71 dBA as seen in Table 3.5-2.

TABLE 3.5-2: Long-Term Noise Measurement Data Summary

Location	Activity Category	Date	24-Hour L_{eq}(dBA)	Peak-Hour L_{eq}(dBA)
1-LT: YBI, Location 1	B	2/9/98	72	74
2-LT: YBI, Location 2	B	2/9/98	69	72
5-LT: YBI, Location 5	B	2/10/98	59	65
6-LT: YBI, Location 6	B	2/11/98	70	76
12-LT: OT, Location 12	D	2/11/98	71	73

Source: Noise and Vibration Study, September 1998.

3.5.6 Existing Measured Vibrations

Vibration measurements were made at five locations: at and near the bridge columns on YBI and at several points on TI. Short-term measurements were made during freely flowing traffic conditions to obtain representative vibration levels. At the base of the bridge column, the measured vertical peak vibration velocity included background (0.007 centimeter per second [0.003 inch per second]), wind induced (0.01 to 0.02 centimeter per second [0.006-0.007 inch per second]), and truck-related (0.03 centimeter per second [0.01 inch per second]) vibration. The peak vibration velocity measured at a distance of 30 meters (100 feet) from the bridge column included background (0.006 centimeter per second [0.002 inch per second]) and truck-related (0.02 centimeter per second [0.009 inch per second]) vibration. The measurements indicated that heavy-duty trucks crossing the bridge were the primary sources of vibration in the immediate vicinity of the bridge structure.

However, on TI (where film studios are located), measured vibration levels (0.001 to 0.02 centimeter per second [0.0005 to 0.007 inch per second]) were primarily associated with wind and wave action at the shoreline. There was no observed correlation between the

measured vibration near the film studios on TI and heavy truck traffic on the SFOBB. It should be noted that the human threshold of perception to continuous vibrations is 0.015 to 0.030 centimeter per second (0.006 to 0.019 inch per second). It is unlikely that the levels measured near the film studios are perceptible by humans. The vibration thresholds for film studio equipment may be lower than the threshold for human perception. It is assumed that the current level of vibration at the film studios is acceptable to the operators of the studios and does not hinder operations.

Table 3.5-3: Short-Term Noise Measurement Data Summary (Page 1 of 2)

		Measurement Period			Measurement Results
Measurement Location[a]	**Measurement Type**	**Date (month/ day/yr.)**	**Start Time (hr:min)**	**Duration (min:sec)**	**L_{eq}(dBA)**
Site 1A: YBI: On sidewalk between Bldgs. 1 and 2 adjacent to fire hydrant.	I-80 Traffic Noise	2/9/98	13:55	15:00	69
Site 1B: YBI: Same as 1A.	I-80 Traffic Noise	2/10/98	13:45	15:00	71
Site 1C: YBI: In center of grassy knoll west of Bldg. 4.	I-80 Traffic Noise	2/9/98	14:17	15:00	66
Site 1D: YBI: Same as 1C.	I-80 Traffic Noise	2/10/98	13:15	15:00	68
Site 2A: YBI: 10 feet north of edge of bluff approx. 35' south of bldg.	I-80 Traffic Noise	2/9/98	11:30	15:00	71
Site 2B: YBI: Same as 2A.	I-80 Traffic Noise	2/9/98	11:45	15:00	71
Site 2C: YBI: Same as 2A.	I-80 Traffic Noise	2/10/98	14:55	15:00	71
Site 3A: YBI: 8' north of garage of Bldg. 267. View of lower deck of I-80.	I-80 Traffic Noise	2/9/98	12:30	15:00	71
Site 4A: YBI: Front porch of Quarters 8.	I-80 Traffic Noise	2/11/98	17:30	10:00	70
Site 4B: YBI: Same as 4A.	I-80 Traffic Noise	2/12/98	10:30	10:00	70
Site 5A: YBI: 10' east of Facade of Quarters "B".	I-80 Traffic Noise	2/10/98	12:30	15:00	62
Site 5B: YBI: Same as 5A.	I-80 Traffic Noise	2/11/98	12:45	15:00	61
Site 5C: YBI: In front of Quarters "C" ~ 100' from Site 5A.	I-80 Traffic Noise	2/11/98	13:02	10:00	61
Site 5D: YBI: @ Quarters A (southeast of quarters B & C).	Aircraft & Local Ambient (I-80 noise is low)	2/11/98	12:45	15:00	60
Site 6A: YBI: ~ 1' from 6-LT location @ SW side of basketball court, north of USCG housing.	I-80 Traffic Noise	2/11/98	14:15	15:00	69
Site 6C: YBI: In center of grassy area surrounded by USCG housing.	I-80 Traffic Noise	2/11/98	15:00	15:00	68
Site 7A: YBI: USCG admin bldgs. north side facing the bridge.	I-80 Traffic Noise	2/11/98	17:05	5:00	67
Site 7B: YBI: Same as 7A.	I-80 Traffic Noise	2/11/98	17:15	5:00	67
Site 9A: YBI: In parking lot of Bldg. 213.	I-80 Traffic Noise	2/9/98	16:50	15:00	73
Site 9B: YBI: Same as 9A.	I-80 Traffic Noise	2/11/98	16:00	10:00	73

Note: YBI=Yerba Buena Island; OT=Oakland Touchdown Area; TI=Treasure Island; 1'=0.3048 m

[a] All measurement locations on YBI are classified as Activity Category B, except locations 7A and 7B which are Category C. Locations on the Oakland Touchdown area and TI are classified as Category C.

Table 3.5-3: Short-Term Noise Measurement Data Summary (Page 2 of 2)

		Measurement Period			Measurement Results
Measurement Location[a]	**Measurement Type**	**Date (month/ day/yr.)**	**Start Time (hr:min)**	**Duration (min:sec)**	**L_{eq}(dBA)**
Site 10A: YBI: Just south of Bldg. 262, (old torpedo factory).	I-80 Traffic Noise	2/9/98	17:30	15:00	74
Site 10B: YBI: Same as 10A.	I-80 Traffic Noise	2/11/98	16:47	5:00	74
Site 11A: YBI: @ tennis courts north of USCG housing.	I-80 Traffic Noise	2/11/98	14:35	15:00	71
Site 11C: YBI: In lot just south of Bldg. 40 (sea cadets residence).	I-80 Traffic Noise	2/11/98	14:50	15:00	73
Site 12A: OT: halfway out on rounded promontory.	I-80 Traffic Noise	2/11/98	11:50	10:00	70
Site 12C: OT: ~ 1 foot from LT location	I-80 Traffic Noise	2/11/98	12:00	15:00	71
Site 13A: OT: 50 feet east of cable station; 25 feet west of end of paved road.	I-80 Traffic Noise	2/11/98	10:10	15:00	70
Site 13C: OT: At fence line near promontory, 10' east of EBMUD chem. treatment bldg.	I-80 Traffic Noise	2/11/98	10:38	15:00	71
Site 17A: OT: ~ 60' from west side of radio bldg., near rear facade line.	I-80 Traffic Noise	2/13/98	11:00	15:00	64
Site 17B: OT: Same as 17A.	I-80 Traffic Noise	2/13/98	11:15	6:00	64
Site 18A: OT: 15 feet north of power pole and 100 feet east of cellular site.	I-80 Traffic Noise	2/11/98	11:00	15:00	65
Site 20A: YBI: Center of field.	I-80 Traffic Noise	2/11/98	16:15	6:00	69
Site 21A: YBI: @ fire hydrant H-44 near edge of bluff, bridge overhead.	I-80 Traffic Noise	2/11/98	16:30	10:00	71
Film Studio: TI: ~ 40 feet south of studio bldg., in parking lot facing bridge.	I-80 Traffic Noise, aircraft	2/12/98	14:00	10:00	62

Note: YBI=Yerba Buena Island; OT=Oakland Touchdown Area; TI=Treasure Island; 1'=0.3048 m
[a] All measurement locations on YBI are classified as Activity Category B, except locations 7A and 7B which are Category C. Locations on the Oakland Touchdown area and TI are classified as Category C.
Source: Noise and Vibration Study, September 1998.

Table 3.5-4: Summary Of Existing Modeled Peak-Noise-Hour Noise Levels

Location #	Noise Receptor	Existing Modeled Peak-Noise-Hour Noise Level L_{eq} (dBA)
1	1A	72
	1C	70
	1-LT	71
	1-M1	74
	1-M2	70
	1-M3	69
	1-M4	70
	1-M5	75
2	2A	74
	2-M1	71
3	3A	75
4	4A	72
5	5A	66
	5C	64
	5D	64
	5-M1	67
6	6A	72
	6C	71
	6-M1	72
	6-M2	72
7	7A	69
	7-M1	71
9	9A	76
	9-M1	76
10	10A	77
	10-M1	77
11	11A	75
	11C	77
	11-M1	77
	11-M2	77
	11-M3	77
12	12A	72
	12-M1	71
	12-M2	74
	12-LT	73
13	13A	73
	13C	74
	13-M1	73
	13-M2	71
	13-M3	71
17	17A	66
	17-M1	70
18	18A	69
	18-M1	66
	18-M2	65
20	20A	72
	20-M1	72
21	21A	74
	21-M1	73
	21-M2	73
	21-M3	73
	STUDIO	67

Note: All measurement locations on YBI are classified as Activity Category B, except locations 7A and 7B which are Category C. Locations on the Oakland Touchdown area and TI are classified as Category C.
Source: Noise and Vibration Study, September 1998.

3.6 HAZARDOUS WASTES

A Hazardous Wastes Assessment was conducted for the East Span Project to identify potential contaminant sources within and adjacent to the project area that may affect design and construction of the project. The assessment is available for review at the locations indicated in the Preface. For purposes of this assessment, hazardous wastes or materials include hazardous substances as regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), hazardous wastes as regulated under the Resource Conservation and Recovery Act of 1976 (RCRA), and the California Hazardous Waste Control Law (HWCL), and other wastes regulated under federal, state, and local regulations. Information in regard to sampling and analysis of sediments that would be dredged as part of the East Span Project is presented in Section 3.12.2 — Sediment Sampling and Analysis.

3.6.1 Legal and Regulatory Requirements

The following presents an overview of the major laws and regulations that apply to hazardous waste of the East Span Project.

- The CERCLA or Superfund, as amended by the Superfund Amendments and Reauthorization Act (SARA), was originally passed in 1980. CERCLA created national policies and procedures to identify and remediate sites previously contaminated by the release of hazardous substances. These laws have the effect of holding past and present owners of real property liable for the costs of site investigations and remediation associated with environmental contamination regardless of whether the current owner was responsible for the contamination.

- The RCRA regulates hazardous waste storage, treatment, and disposal sites. The State of California implements the RCRA requirements under authorization from the federal EPA through enforcement of the California Hazardous Waste Control Law, which provides regulations that equal or exceed the federal standards.

- Other potentially relevant environmental laws and regulations include:

  - Clean Water Act (CWA);
  - Toxic Substance Control Act (TSCA);
  - Clean Air Act (CAA);
  - National Emission Standards for Hazardous Air Pollutants (NESHAPS); and
  - Various state environmental laws and regulations

In the project area, the State Water Quality Control Board, San Francisco Bay Region, administers federal, state, and local regulations for cleanup of affected surface water, groundwater, and soils that present a threat to water quality. However, the California Department of Toxic Substances Control (DTSC) has taken responsibility for regulatory oversight of several of the cleanup actions on YBI. The California Occupational Safety and Health Agency (CalOSHA) has supervisory authority over hazardous substance and waste handling by workers during construction.

3.6.2 Existing Data Review

A review of the existing hazardous wastes reports and data was conducted to identify known or potential hazardous waste concerns that may be affected by the East Span Project alternatives. A summary of these reports can be found in the Hazardous Wastes Assessment.

3.6.3 Regulatory Database Search

Publicly available federal and state environmental databases were reviewed to obtain information on the location of potential sites of environmental concern that may adversely affect the project. These sites include registered underground storage tanks (USTs) and leaking underground storage tanks (LUSTs); facilities that use, generate, treat, or dispose of hazardous wastes and/or substances; transporters of hazardous wastes; solid waste landfill sites; and unauthorized spills and releases of regulated substances.

The database search area encompassed a distance that extended from 0.8 to 1.6 kilometers (0.5 to 1 mile) on either side of the project area, depending on the type of database listing. Databases reviewed for this report are described in the Hazardous Wastes Assessment.

3.6.4 Historical Information Update and Site Reconnaissance

An evaluation of historical land uses and land use changes in the project area was conducted to identify potential historical contaminant sources. This update included interviews with environmental specialists and current property owners, as well as a historical photographic review.

A site reconnaissance in the project area and vicinity was completed to identify and confirm potential contaminant sources identified in earlier data reviews and to identify potential unreported contaminant sources.

3.6.5 Potential Sources of Contamination

Potential contaminant sources that were identified through the existing data review were screened to determine their potential to conflict with the project based on the following criteria:

- The occurrence of a documented release based on either public records or physical observation;
- The physical, chemical, and toxicological characteristics of suspected contaminants released and the media potentially affected (soil, water, and air);
- Distance from the project area;

- Nature of proposed design and construction activities in relation to the location and possible impact from a potential contaminant source; and

- Estimated groundwater flow direction and depth.

These criteria were used to eliminate potential sources that were unlikely to conflict with the project. Potential contaminant sources not eliminated during this screening process were recommended for further evaluation.

Table 3.6-1 lists potential contaminant sites on YBI and Table 3.6-2 summarizes the findings of the Oakland Touchdown area hazardous wastes assessment. Figures 3-15a and 3-15b in Appendix A show the locations of known or potential contaminant sources for YBI and the Oakland Touchdown area, respectively. The Navy occupies a significant portion of the project area on YBI. The Navy, as part of an Installation Restoration Program (IRP) for Naval Station Treasure Island (NSTI), established a Federal Facility Remediation Agreement among the Navy, the DTSC, and the San Francisco Bay Regional Water Quality Control Board (RWQCB). Under this agreement, the Navy agreed to undertake and report on specified tasks associated with environmental assessment and response actions at 25 Installation Restoration (IR) sites under the IRP in accordance with CERCLA. Some of the IR sites are located on land transferred in October 2000 by FHWA from the Navy to Caltrans. With regard to those sites and subject to construction and safety considerations, Caltrans will provide access to the Navy for purposes of performing further testing and/or remediation.

Two of the potential contaminant sites are on the former Oakland Army Base, which is located in a highly industrialized area. Property adjacent to the former Oakland Army Base is used as a maritime shipping facility. An environmental baseline study has been conducted to document the physical condition of the former Oakland Army Base property resulting from the use, storage, and disposal of hazardous substances and petroleum products during the base's history.[18] It was recommended that further investigation be conducted in the area around Burma Road and the south side of the spit to determine the source and vertical and horizontal extent of the previously detected contamination.

In addition to the contaminant sites listed in Tables 3.6-1 and 3.6-2, lead contamination due to vehicle exhaust emissions of leaded gasoline can exist in materials next to freeways constructed prior to the ban of such fuels. In some locations, this contamination has been found at concentrations that are a potential hazard to human health and the environment if not handled correctly. The California Environmental Protection Agency, DTSC, has performed a health risk assessment of this material to determine its potential hazards and how these hazards can be reduced. As a result, DTSC granted Caltrans a variance to hazardous waste regulations that allows reuse of this material within the highway right of way under specific conditions.

[18] Foster Wheeler, Inc., *Basewide Preliminary Assessment/Site Inspection (PA/SI) Oakland Army Base, Oakland, California*, Vol. I and II, February 1998.

Table 3.6-1 Known and Potential Contaminant Sources - (Yerba Buena Island)

Source Area	Identified Contaminants
IR 8 – Former Sludge Disposal Area	Surface soil contamination from metals (beryllium and lead) and from pesticides.
IR 11 – Former Landfill	Soil/Fill contamination from pesticides, metals, and petroleum hydrocarbons. Groundwater contamination from metals and petroleum hydrocarbons.
IR 13, Section E – Storm Water Off-shore Sediments	Contamination from storm water discharges. Off-shore sampling complete for Phase II Ecological Risk Assessment (analysis results pending).
IR 29 – East Side Contaminated Bridge Soils	Lead contamination of near-surface soils. Petroleum hydrocarbons detected in soil at select locations.
Building 204/208 LUST Site (both buildings have been demolished)	Petroleum hydrocarbon contamination from former gas station and adjacent fire station.
Building 270 LUST Site	Petroleum hydrocarbon contamination from active LUST site. Additional subsurface investigation pending.
Building 40 LUST Site	Petroleum hydrocarbon in groundwater. Possible upgradient (Site 270) source.
Fuel Delivery Lines near Building 213	Removal report documenting soil contamination from petroleum hydrocarbons and analytical testing is pending.
SFOBB Structure	Lead-based paint and asbestos.
Buildings to be demolished	Potential for lead-based paint and asbestos.

Source: Hazardous Wastes Assessment, 1998.

Table 3.6-2 Known and Potential Contaminant Sources - Oakland Touchdown Area

Source Area	Contaminant
Bridge footings in eastern approach area	Soil: TRPH, PAHs, Pesticides, PCBs, and Pb Groundwater: TRPH, Sb, Cd, Cr, Ni, Ag, and Ti
Army Site #1 – western end of Burma Road in Parcel 1	Soil: TPH as motor oil, and PCE
Army Site #2 – 456 m (1,500 ft) east of west end of Burma Road in Parcel 1	Soil: TPH as motor oil
Caltrans Maintenance Facility and undeveloped median area	Soil: PCBs, TPH, Pb, and VOCs Groundwater: TPH, dissolved Pb, Sb, and Cr Structure: Lead-based paint and asbestos
EBMUD Dechlorination Facility	Soil: Sodium Bisulfide
Former Landfill Area (southeast)	Soil: TPH, VOCs, SVOCs, and Pb Groundwater: TPH and SVOCs
SFOBB Structure	Lead-based paint and asbestos

Ag = Silver
Cd = Cadmium
Cr = Chromium
Ni = Nickel
PAHs = Polyaromatic Hydrocarbons
Pb = Lead
PCBs = Polychlorinated Biphenyl
PCE = Tetrachloroethene
Sb = Antimony
SVOC = Semi-Volatile Organic Compound
Ti = Titanium
TPH = Total Petroleum Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
VOC = Volatile Organic Compound

Source: Hazardous Wastes Assessment, 1998

3.7 GEOLOGY, SOILS, AND SEISMICITY

3.7.1 Regional Geologic Setting

The project is located in the Coast Ranges geologic/geomorphic province of central and northern California. The Coast Ranges province extends from approximately 500 kilometers (300 miles) south and 400 kilometers (250 miles) north of the project site. The Coast Ranges province is bordered to the north by the Klamath Mountains, to the south by the Transverse Ranges province, to the west by the Pacific Ocean, and to the east by the Great Valley province.

The Coast Ranges have a general northwest orientation and are characterized by north-northwest trending folds and faults. The province consists of sedimentary, metamorphic, volcanic, and igneous rocks ranging in age from the Jurassic/Cretaceous age (100 to 200 million years ago) to the present.

The San Francisco Bay region is located within a northwesterly oriented geomorphic depression called the San Francisco Bay-Santa Clara Valley depression. This depression and its surrounding mountains all have relatively recent tectonic origin. Formation began about one million years ago (within the Quaternary age). The sea level has fluctuated significantly several times prior to and during Holocene times, and sediments known as Bay mud have been and are currently being deposited under estuarine conditions. The Bay mud consists of unconsolidated to moderately consolidated, saturated, organic-rich silty marine clays. (See Figure 3-16 in Appendix A for a geologic profile of the project area.)

3.7.2 Regional Seismic Setting and Seismicity

The San Francisco Bay Area is one of the more seismically active regions of California. There are at least seven active faults (San Andreas, Hayward, Rodgers Creek, Calaveras, Green Valley, Concord, and Franklin) within 50 kilometers (31 miles) of the project area. The active faults trend northwesterly and display a similar right-lateral, primarily horizontal movement. These faults have generated large historical earthquakes resulting in major surface disturbances, and segments of these faults have been designated as Special Earthquake Fault Zones by the California Division of Mines and Geology (Earthquake Fault Zoning Act). Numerous other smaller active faults are present throughout the region, but are farther from the project area and not believed to be capable of causing significant earthquake shaking within the project area.

The project area's main geologic structures are associated with two major faults: the San Andreas fault about 14 kilometers (9 miles) to the west and the Hayward fault, which is located about 8 kilometers (5 miles) to the east of the study area. Both faults have had large historic earthquakes. Earthquakes on the San Andreas fault include the

7.8 magnitude[19] (Richter Scale) earthquake on April 18, 1906, and the 7.1 magnitude (Richter Scale) Loma Prieta earthquake on October 17, 1989. These earthquakes caused widespread damage throughout the greater San Francisco Bay Area. The Hayward fault has long been documented as active, with major earthquakes in 1836 and 1868. A maximum credible earthquake (MCE) is the largest earthquake reasonably capable of occurring based on current geological knowledge. The MCE has been estimated for the San Andreas fault at 8 and 7-1/4 on the Hayward fault.

3.7.3 Geology and Geotechnical Conditions in the Project Area

Yerba Buena Island

YBI is a naturally occurring island approximately 57 hectares (142 acres) in size. The change in topography of the island is extreme, with steep slopes over short distances. The elevations range from 103 meters (338 feet) near the center of the island to sea level. Slopes range from 5 to 75 percent. The U.S. Coast Guard (USCG) land along the southeast shore occupies the flattest area of the island and has been enlarged through the placement of fill material.

The island is underlain by Franciscan Formation bedrock consisting of interbedded graywacke sandstone, mudstone, and claystone of varying proportions. On Yerba Buena Island (YBI), the majority of the Franciscan Formation is covered with unlithified sand and alluvial deposits, along with localized areas of artificial fill. There are several Franciscan Formation outcrops on YBI. The unconsolidated sedimentary deposits consist of silty sand with interbeds of clayey sand and clayey silt. Areas of artificial fill surrounding YBI, such as TI and part of the USCG station, were created by placing dredged Bay deposits and cut materials from YBI in relatively shallow water areas to create emergent usable pads.

Slope Stability. Existing landslides have been identified at various locations on YBI and appear to range from older, probably prehistoric, failures to recent failures. The modes of the slope failures include discontinuity-controlled rock failures (due to weakness in the rock), relatively deep-seated rotational landslides, and relatively surficial failures. Rock-wedge failures[20] have occurred in the Franciscan Formation slopes surrounding the northeast point and eastern YBI tunnel approach. The sizes of the rock-wedge failures are variable and range up to in excess of 30 meters (100 feet) in width and length. Of most concern is a larger rock-wedge failure in the vicinity of the proposed west column for the northern alignments. Relatively deep-seated rotational landslides are located on the west and northwest of the eastern YBI tunnel approach area but appear to have occurred outside of the project study area. The landslides appear to be older and probably failed prehistorically. A number of relatively shallow slope failures are located in unconsolidated sedimentary deposits on the southwest slope of the eastern YBI tunnel approach above the USCG station. These landslides

[19] Although the 1906 earthquake has been given an 8+ magnitude by some, the best estimate and also the current consensus among seismologists is 7.8.

[20] A rock-wedge failure is characterized as a movement or sliding of a rock mass, possibly including overlying soil, along existing discontinuities such as fractures or joints within the rock fabric. Movement or sliding typically occurs along layers or zones of low shear strength materials that have formed within the rock mass. Uplifting, folding, and faulting may cause the rock to develop low shear strength.

are up to 45 meters (150 feet) high, 61 meters (200 feet) wide, and 6 meters (20 feet) thick.[21] Some of the landslides have occurred recently. Additional debris-flow failures and zones of shallow creeping soils have been identified in the Franciscan Formation on the northwest and southeast slopes of the eastern YBI tunnel approach and on the east and north facing slopes of the northeast point.

Portion of the Project Area in the Bay

In general, the area has a westerly thinning sequence of Holocene- and Pleistocene-age marine and alluvial sediments overlaying Franciscan Formation bedrock, which ranges from near the surface at YBI to over 100 meters (328 feet) below the Bay bottom near the Oakland Touchdown. The marine sediments are primarily clays and silts, while the alluvial sediments are more commonly sands. The Holocene- and Pleistocene-age sequence in some areas of the study area has been eroded by various episodes of channeling. In general, marine clays are thicker and the alluvial sands are thinner (or absent) within buried paleochannels.

Oakland Touchdown

The eastern approach to the San Francisco-Oakland Bay Bridge (SFOBB) sits on a man-made spit that extends out into San Francisco Bay. The site is generally flat, rising approximately 1.5 to 3 meters (5 to 10 feet) above sea level. The area is a former tidal flat that was filled prior to the construction of the existing SFOBB in the 1930s. The source of the fill is not known, but was likely a combination of dredged soil and imported fill, including some rubble and other debris. Due to the fill, settlement of the underlying Young Bay Mud has likely occurred, creating mud that is stronger than its nearby marine counterpart.

The Franciscan Formation in this area is deep (an elevation of -135 to -150 meters [-440 to -500 feet]) and slopes gently to the east/southeast.[22] A sequence of Holocene- and Pleistocene-age marine and alluvial sediments overlie the bedrock. The subsurface soils vary and consist of generally less than 3 meters (10 feet) of loose, sandy fill that is underlain by a very soft, saturated layer of Bay mud that extends down to approximately 12 meters (40 feet).[23,24] In other areas, the soil is composed of coarser grain sediments that include various amounts of gravel. The primary material in the underlying Merritt-Posey-San Antonio Formation at the Oakland Touchdown is a layer of dense sand of approximately 4.5 to 6.1 meters (15 to 20 feet) thick. A north-south trending paleochannel exists under the Oakland Touchdown area. This paleochannel does not appear to contain alluvial sands.

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[21] Fugro and Earth Mechanics, *Preliminary Yerba Buena Island Geotechnical Site Characterization Report San Francisco-Oakland Bay Bridge East Span Seismic Safety Project*, prepared for Caltrans, June 1998.

[22] Fugro and Earth Mechanics, *Preliminary Oakland Shore Approach Geotechnical Site Characterization Report San Francisco-Oakland Bay Bridge East Span Seismic Safety Project*, prepared for Caltrans, June 1998.

[23] Apex, *Report Site Investigation San Francisco-Oakland Bay Bridge, East Bay Span, Oakland, California*, State of California, Department of Transportation, March 1994.

[24] Olivia Chen Consultants, *EBMUD Sodium Bisulfite Facilities for Main WWTP Geotechnical Findings and Foundation Recommendations*, CH2M Hill, September 1995.

3.7.4 Tsunamis

Tsunamis are seismically induced "sea waves" that are generated when large subsea earth or rock masses are displaced during earthquakes or very large landslides. The low-amplitude very-long-period waves travel very quickly and increase significantly in size and height upon entering shallow water. The waves can cause significant damage to coastal areas.

A map prepared in 1972 by the U.S. Geological Survey (USGS), entitled "Maps Showing Areas of Potential Inundation by Tsunamis in the San Francisco Bay Region, California," indicates that the Oakland Touchdown area would be inundated with about 3.1 to 3.7 meters (10 to 12 feet) of water if a 6.1-meter (20-foot) wave were to occur at the Golden Gate. (A 6.1-meter [20-foot] wave approximates the run-up that occurred at Crescent City, California, due to the 1964 Alaska earthquake.) Given the hypothetical nature of the information, it is likely the inundation level at the Oakland Touchdown area would be lower, at a level closer to 1 meter (3.3 feet).[25]

According to the USGS map, the portion of the bridge on YBI would not be inundated by a 6.1-meter (20-foot) tsunami, although lower-lying fill areas such as the USCG station could be subject to damage.

[25] Source: Gerry Houlihan, T. Y. Lin International, Inc.

3.8 WATER RESOURCES AND QUALITY

3.8.1 Regulatory Setting

Federal

The point source discharge of any pollutants to Waters of the U.S. is regulated under the Federal Water Pollution Control Act by the National Pollutant Discharge Elimination System (NPDES) Program. The Environmental Protection Agency (EPA) administers the NPDES program throughout the nation, and it has given regulatory authority to those states with a local regulatory body. (See State discussion below for further details.)

Section 401 of the Federal Clean Water Act (FCWA) applies to the SFOBB East Span Project. Under the Section 401 Water Quality Certification Program, every applicant for a federal permit or license for an activity which may result in a discharge into a water body must request state certification that the proposed activity will not violate state and federal water quality standards.

State

In the State of California, under the Porter-Cologne Water Quality Control Act, the State Water Resources Control Board has the ultimate authority over state water rights and water quality policy. The NPDES program in California is implemented by the State Water Resources Control Board through its nine Regional Water Quality Control Boards (RWQCBs) (also established under the Porter-Cologne Act).

A NPDES permit is required for any proposed point source waste or storm water discharges from municipal areas with populations of 100,000 or more to surface waters and from construction activities disturbing 2 hectares (5 acres) or more of land. Caltrans District 4 currently operates under statewide NPDES Permit No. CAS000003, which covers all Caltrans activities, including those within the boundaries of RWQCB's jurisdiction. As a result, the East Span Project is covered under this NPDES permit.

The RWQCB has adopted a Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan), which sets forth water quality objectives to protect and enhance the beneficial uses of the Bay and its tributaries. Beneficial uses of the waters in San Francisco Bay include commercial and sport fishing, estuarine habitat, industrial service and process supply, fish migration, navigation, preservation of rare and endangered species, recreation, shellfish harvesting, fish spawning, and wildlife habitat. Water quality objectives, which can be narrative or measurable, include parameters such as bacteria, bioaccumulation, biostimulatory substances, color, dissolved oxygen, floating material, oil and grease, population and community ecology, pH, salinity, sediment, suspended material, settleable material, sulfide, temperature, toxicity, turbidity, and un-ionized ammonia. Some of the objectives are listed in Table 3.8-3 along with the Central Bay's status in regard to the objectives.

The RWQCB administers Section 401 of the Federal Clean Water Act, as described above. The RWQCB issues certifications that proposed projects will not violate state

and federal water quality standards. Caltrans will obtain a Water Quality Certification for this project from the RWQCB prior to project construction.

3.8.2 Existing Drainage Patterns and Water Quality

The San Francisco Bay has a drainage area of many thousand square kilometers. It is the primary point of outfall to the Pacific Ocean for a large portion of California.

Flood Flows

Flood flows are not defined beneath the SFOBB. The influence of flood flows on the project area is minimal because of its location in relation to the tributary streams to San Francisco Bay.

Tidal Influences

Central San Francisco Bay, in the vicinity of the East Span Project, is influenced by the tides of the Bay. The frequency and height of tides throughout the Bay have been estimated by the ACOE.[26] Table 3.8-1 summarizes the tidal elevations for the Bay, as measured at two tide measuring stations in the project area.

Table 3.8-1 High Tide Elevation

	Station			
	Matson Wharf[a]		Yerba Buena Island[a]	
Frequency	meters[b,c]	feet[b,c]	meters[b,c]	feet[b,c]
10-year	1.80	5.9	1.80	5.9
50-year (interpolated)	1.89	6.2	1.89	6.2
100-year	1.92	6.3	1.92	6.3
100-year (adopted)	**1.98**	**6.5**	**1.98**	**6.5**
500-year	2.01	6.6	2.01	6.6

Source: U.S. Army Corps of Engineers, 1984.

[a] Matson Wharf (Station 4779) is located in the Oakland Touchdown area. The YBI station is Station 4782.
[b] Elevations per NGVD (National Geodetic Vertical Datum).
[c] To estimate elevations above mean lower low water, add an additional 0.896 meter (2.94 feet) to the values in the table.

The high tide elevations presented in Table 3.8-1 are based on historical tidal data. The EPA and other agencies believe that concentrations of atmospheric gases will continue to increase in the coming decades, resulting in global warming and subsequent thermal expansion, which will cause the sea level to rise. The ACOE has made an attempt to adjust the predicted tidal elevations based on historical data to include this expected increase in sea level. Table 3.8-2 shows high tide elevations that have been adjusted for expected increases in sea level.

[26] U.S. Army Corps of Engineers, *San Francisco Bay, Tidal Stage vs. Frequency Study*, October 1984.

Table 3.8-2 Tidal Elevations Including Estimated Sea Level Rise

	Planning Year			
	Year 2000		Year 2050	
Frequency	**meters**	**feet**	**meters**	**feet**
10-year	1.89-1.92	6.2-6.3	2.32-2.60	7.6-8.53
50-year (interpolated)	1.98-2.01	6.5-6.6	2.41-2.69	7.90-8.83
100-year	2.01-2.04	6.6-6.7	2.44-2.72	8.00-8.92
100-year (adopted)[a]	**2.07-2.10**	**6.8-6.9**	**2.50-2.78**	**8.20-9.12**
500-year	2.10-2.13	6.9-7.0	2.53-2.84	8.30-9.33

Source: U.S. Army Corps of Engineers, 1984.
Notes: Year 2000 estimated rise 0.09-0.12 meter (0.3-0.4 foot); Year 2050 estimated rise 0.52-0.80 meter (1.7-2.6 feet).
Elevations per NGVD (National Geodetic Vertical Datum).

[a] The values presented in the table are from the U.S. Army Corps of Engineers. Data from the San Francisco Bay Conservation and Development Commission[27] can also be extrapolated to obtain tidal elevation values for the planning years 2000 and 2050. These values would be 2.04 meters (6.7 feet) for the year 2000 and 2.19 meters (7.2 feet) for the year 2050. These lower values were used in the design planning process for the East Span Project.

Surface Water Quality

The surface water body in the project area is the Central San Francisco Bay, which connects to the Pacific Ocean through the Golden Gate Channel. Surface runoff from the project area flows directly or indirectly into the Central San Francisco Bay. The surface runoff is composed of freeway runoff from the SFOBB and I-80 and the SFOBB Toll Plaza, urban runoff from adjacent streets, and the land runoff from adjacent industrial sites and open areas. Other discharges to the Central San Francisco Bay include discharges from municipal wastewater treatment plants, discharges from dredging operations, and discharges from other industrial processes.

Since 1993, surface water quality throughout the estuary (San Francisco Bay) has been evaluated by the Regional Monitoring Program (RMP). The San Francisco Estuary Institute (SFEI), a non-profit scientific organization established in 1983, was chosen by the RWQCB and Bay Area dischargers to administer the program. The RMP is funded by Bay Area dischargers as well as federal and state agencies. The YBI station is located in the project area. In addition, three other stations are located in the vicinity of the project study area. These stations are: Alameda Station, located upstream of the project area; Point Isabel Station, located downstream of the project area toward the Central Bay; and Horseshoe Bay Station, located downstream of the project area toward the Golden Gate Channel.

The SFEI 1996 Annual Report[28] covers the fourth year of the RMP. The results for the 1996 study period indicate that, in general, there are water quality variations from

[27] San Francisco Bay Conservation and Development Commission, *Sea Level Rise: Predictions and Implications for San Francisco Bay*, October 1988, revised.

[28] San Francisco Estuary Institute, 1996 Annual Report, Regional Monitoring Program, 1997.

season to season. Table 3.8-3 presents a summary of the concentrations of various pollutants in the Central Bay monitored in 1996.

Table 3.8-3 Central San Francisco Bay Surface Water Concentrations

Pollutant	Range of Concentrations	RWQCB Water Quality Objective
Salinity	5-32 parts per thousand	Controllable water quality factors shall not increase salinity of waters so as to adversely affect beneficial uses.
Total Suspended Solids	2-25 µg/L	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Dissolved Organic Carbon	960-3,840 µg/L	No objective
Nutrients:		
ammonia	10.92-159.46 µg/L	Annual mean 0.025 mg/L, maximum 0.16 mg/L
nitrite	185.64-487.34 µg/L	No objective
nitrate	9.24-58.8 µg/L	No objective
phosphate	59.83-207.7 µg/L	No objective
Trace Elements:		
arsenic	1.5-2.1 µg/L	4-day average 36.0 µg/L, 1-hour average 69.0 µg/L
cadmium	0.03-0.10 µg/L	4-day average 9.3 µg/L, 1-hour average 43.0 µg/L
chromium	0.1-3 µg/L	4-day average 50.0 µg/L, 1-hour average 1100.0 µg/L
copper	0.4-3.3 µg/L	1-hour average 4.9 µg/L
lead	0.05-0.9 µg/L	4-day average 5.6 µg/L, 1-hour average 140.0 µg/L
nickel	0.5-7 µg/L	24-hour average 7.1 µg/L, instantaneous 140.0 µg/L
zinc	0.3-8 µg/L	24-hour average 58.0 µg/L, instantaneous 170.0 µg/L

Note: µg/L = microgram per liter
Source: Caltrans District 4, April 1998.

3.8.3 Groundwater

The east end of the project, at the Oakland Touchdown, lies over the East Bay Plain groundwater basin in Alameda County. Existing and potential beneficial uses as designated in the San Francisco Bay Basin Water Quality Control Plan for this regional basin include municipal and domestic water supply, industrial service water supply, industrial process water supply, and agricultural water supply. The East Bay Plain extends over an area of 295 square kilometers (114 square miles), with an average depth to aquifer below land surface ranging between 8 meters (25 feet) and 183 meters (596 feet), and a storage capacity of 3.4 billion cubic meters (2,770,000 acre-feet).

3.9 NATURAL RESOURCES

This section addresses existing vegetative communities and associated wildlife, special status plant and wildlife species, special aquatic sites, wetlands, and non-wetland waters of the United States that occur in the project area. Detailed survey information is provided in the Natural Environment Study and Biological Assessment.

3.9.1 Regulatory Setting

Natural resources in the project area were evaluated in accordance with the provisions of state and federal environmental statutes and regulations, including the following:

- Federal Endangered Species Act of 1973 (as amended). This law protects plant and animal species (and their habitats) listed under the Act as either Threatened, Endangered, or proposed for listing as Threatened or Endangered. Species are listed as endangered if found to be in danger of extinction throughout all or a significant portion of their range. Threatened species are identified under the federal act as those likely to become endangered within the foreseeable future. Species are listed after being presented in a formal petition and public review process that is documented in the Federal Register;

- California Endangered Species Act of 1985. This is similar to the federal act, but it applies only to plant and animal species that occur in the state of California. Individual species declared to be either threatened or endangered by the California Fish and Game Commission are included in Title 14 of the California Code of Regulations;

- Federal Clean Water Act (Section 404). The Clean Water Act applies to the disposal of dredged or fill materials into the "Waters of the United States." Waters of the U.S. include those used for navigation or leading to navigable rivers, waters used for interstate commerce including isolated wetlands, lakes, and wetlands bordering streams or other water bodies;

- Federal Rivers and Harbors Act of 1899. Section 10 of the Rivers and Harbors Act prohibits the unauthorized obstruction or alteration of any navigable water. Navigable waters are those "subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (40 CFR 1989);

- Marine Mammal Protection Act. This federal legislation provides for the protection and conservation of marine mammal species by prohibiting the harassment, hunting, capture, or killing of any marine mammal;

- Migratory Bird Treaty Act. Originally enacted in 1918, this federal legislation reflects agreements made between the U.S. and England, Mexico, the former Soviet Union, and Japan to protect all of North America's migratory bird populations;

- McAteer-Petris Act. This state legislation was passed in 1965 and created the San Francisco Bay Conservation and Development Commission (BCDC). BCDC regulates dredging and filling within the San Francisco Bay and public access within 30 meters (100 feet) of the mean high tide line;

- Magnuson-Stevens Act of 1976 (as amended 1996). This act applies to fisheries resources and fishing activities in Federal waters that extend to 322 kilometers (200 miles) off-shore. Conservation and management of U.S. fisheries, development of domestic fisheries, and phasing out foreign fishing activities are the main objectives of the legislation; and

- Executive Order 11990 (Protection of Wetlands). An order given by President Carter in 1977 to avoid the adverse impacts associated with the destruction or modification of wetlands.

3.9.2 Vegetative Communities and Wildlife

Most of the terrestrial vegetation within the project area consists of non-native plant species. Patches of native vegetation occur on Yerba Buena Island (YBI) and include coast live oak woodland, and northern coastal scrub. The Oakland Touchdown area consists primarily of ruderal vegetation, occurring at the former Oakland Army Base property. Small patches of northern foredune and landscaped vegetation occur along the north side of the Oakland Touchdown area. Figures 3-17 and 3-18 in Appendix A show the habitat types found on YBI and in the Oakland Touchdown area, respectively. Terrestrial vegetative communities and associated wildlife species are summarized below.

Landscaped Non-Native Plant Communities

Typical landscaped species found on YBI include Tasmanian blue gum (*Eucalyptus globulus*), German ivy (*Senecio mikanioides*), and Monterey cypress (*Cupressus macrocarpa*). Native plant species are largely excluded from these areas because of a lack of light due to the density of the overstory canopy, accumulation of debris from overstory trees, human disturbance, and poor soil conditions. Ornamental landscape species at the Oakland Touchdown include iceplant (*Carpobrotus edulis*), Monterey pine (*Pinus radiata*), and acacia (*Acacia spp.*). Landscaped areas are not considered to be sensitive habitat for plant or wildlife species. Common wildlife species that occur in landscaped areas include the European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), Anna's hummingbird (*Calpte anna*), Virginia opossum (*Didelphis virginiana*), Norway rat (*Rattus norvegicus*), striped skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*).

Ruderal Vegetation

Areas that have been heavily disturbed contain ruderal vegetation generally characterized by herbaceous, non-woody species. Ruderal vegetation occurs at the Oakland Touchdown area on the former Oakland Army Base property and at scattered sites along the north side of the existing roadway. These areas provide winter roosting areas for shorebird species during high tides. Some of the shorebird species known to

use these areas include western sandpiper (*Calidris mauri*), semipalmated plover (*Charadrius semipalmatus*), and dunlin (*Calidris alpina*).[29]

Coast Live Oak Woodland

Only a few tree and shrub species associated with coast live oak woodland occur in small patches on YBI, near Macalla Road. Species present include toyon (*Heteromeles arbutifolia*), blue elderberry (*Sambucus mexicanus*), California hazelnut (*Corylus cornuta*), and a few California buckeye (*Aesculus californica*). Understory plant species observed include native species such as poison oak (*Toxicodendron diversilobum*) and California blackberry (*Rubus ursinus*). Non-native plant species observed within the coast live oak woodland include German ivy, Himalayan blackberry (*Rubus discolor*), and Tasmanian blue gum.

Typical wildlife species associated with coast live oak woodland include northern flicker (*Colaptes auratus*), mourning dove (*Zenaida macroura*), western gray squirrel (*Sciurus griseus*), western fence lizard (*Sceloporus occidentalis*), and gopher snake (*Pitouphis melanoleucus*). The black-crowned night heron (*Nycticorax nycticorax*), a species protected under the Migratory Bird Treaty Act, nests and roosts on YBI woodland.

Northern Coastal Scrub

A few patches of northern coastal scrub occur on steep bluffs along the east end of YBI. The dominant plant species in this area is California sagebrush (*Artemisia californica*). Common plant species include farinosa dudleya (*Dudleya farinosa*), yarrow (*Achillea millefolium*), and seaside woolly sunflower (*Eriophyllum staechadifolium*). Wildlife species that could be expected to occur in coastal scrub habitat include white-crowned sparrow (*Zonotrichia leucophrys*), bewick's wren (*Thryomanes bewickii*), and vagrant shrew (*Sorex vagrans*).

Northern Foredunes

A patch of northern foredunes is located on the northern shoreline of the Oakland Touchdown area at Radio Point Beach. The dominant plant species include beach bur (*Ambrosia chamissonis*), fig-marigold (*Carpobrotius edulis*), commonly known as iceplant, and saltgrass. A band of marsh gumplant (*Grindelia stricta* var. *angustifolia*), a California Native Plant Society (CNPS) List 4 species, occurs in a depression behind the foredune area. This area is bound by potential jurisdictional wetlands and large patches of fig-marigold.

3.9.3 Estuarine Environment and Associated Species

The San Francisco-Oakland Bay Bridge (SFOBB) is located in the Central Bay Segment of the San Francisco Bay Estuary. The estuary is commonly divided into several segments (listed from north to south): Suisun Bay, Carquinez Strait, San Pablo Bay, Central Bay, and South Bay. The San Francisco Bay Estuary sits at the terminus of the Sacramento-San Joaquin Delta, a system that drains 40 percent of the land area of California. The San Francisco Bay Estuary and the Sacramento-San Joaquin Delta

[29] Caltrans, Memorandum regarding Wintering Bird Surveys Along the Cypress Reconstruction Mitigation Bike Path, August 1995.

together form one of the largest estuarine systems in North America. Aquatic habitats in the estuary range from deep channel bottoms to shallow marsh pools.

Several species of waterfowl use this habitat in the winter months, including lesser scaup (*Aythya affinis*), surf scoter (*Melanitta perspicillata*), and canvasback (*Aythya valisineria*). Other avian species that are often observed in the project area include brown pelican (*Pelecanus occidentalis*) and western gull (*Larus occidentalis*). A common marine mammal found foraging in the project area is the harbor seal (*Phoca vitulina*).

Northern Coastal Salt Marsh

A small narrow band of northern coastal salt marsh occurs on the north side of YBI adjacent to Clipper Cove. A narrow strip of this habitat also occurs along the north side of Radio Point Beach, adjacent to the Oakland Touchdown. Dominant plant species found in northern coastal salt marshes include pickleweed (*Salicornia virginica*) and saltgrass (*Distichilis spicata*). Animals that have the potential to occur within coastal salt marsh vegetation include the northern salt marsh harvest mouse (*Reithrodontomys raviventris*), a federally endangered species. However, the northern salt marsh harvest mouse does not occur at Clipper Cove or Radio Point Beach because the isolated, narrow band of habitat is not sufficient to support even a small population.

This vegetative community also occurs within the Emeryville Crescent outside the project area. Salt marsh habitat along the Emeryville Crescent provides important breeding and foraging habitat for a variety of migratory and resident wildlife species, including the saltmarsh harvest mouse (*Reithrodontomys raviventris*). Migratory bird species common to salt marsh habitat include northern pintail (*Anas acuta*), mallard (*Anas platyrhynchos*), least sandpiper (*Calidris minutilla*), and willet (*Catoptrophorus semipalmatus*). Resident species that commonly use this habitat include great blue heron (*Ardea herodias*), marsh wren (*Cistothorus palustris*), red-winged blackbird (*Agelaius phoeniceus*), California clapper rail (*Rallus longirostris obsoletus*), and California red-backed vole (*Clethrionomys californicus*).

Intertidal Sand Flats

Intertidal flats occur on the north shore of the Oakland Touchdown and adjacent to the USCG facility at YBI. These areas have a larger grain size (>0.6 millimeter [0.02 inch]) than is typical of mudflats (<0.1 millimeter [0.004 inch]), and are more accurately described as sand flats. These intertidal flats have rivulets and channeling which are attributes of sand flats and not mudflats. The larger grain size of sand flats is due to higher wave energy. Both sand flats and mudflats are special aquatic sites protected under Section 404 of the Clean Water Act.

Sand flats are sparsely vegetated intertidal areas that occur from approximately mean lower low water (MLLW) to mean tide level (MTL) and are exposed at low tides and inundated at high tides. They provide protection to banks and upland shoreline from wave energy and sediment. Sand flats around San Francisco Bay provide habitat for many species of invertebrates, including diatoms, polychaetes, oligochaetes, amphipods, isopods and crustaceans. During low tide, sand flats provide foraging and

roosting areas for nearly one million shorebirds that utilize the Bay during spring and fall migration. Shorebirds present in the project area include western sandpiper (*Calidris mauri*), least sandpiper (*Calidris minutilla*), dunlin (*Calidris alpina*), long- and short-billed dowitcher (*Limnodromus griseus,* and *L. scolopaceus,* respectively), and American avocet (*Recurvirostra americana*). The habitat value of the sand flats in the project area is diminished by the abrupt transition with adjacent uplands and the lack of adjacent wetland habitats. The existing shoreline adjacent to the sand flats at the Oakland Touchdown is protected with rock riprap and the uplands are landscaped with non-native vegetation.

During high tide, sand flats provide foraging habitat for fish, including longfin smelt (*Spirinchus thaleichthys),* staghorn sculpin (*Leptocottus armatus*), starry flounder (*Platichthys stellatus),* and leopard shark *(Triakis semifasciata).* One of the few mammals that are occasionally present on sand flats is the Pacific harbor seal (*Phoca vitulina*).

Eelgrass (*Zostera marina L.*)

Eelgrass beds occur in some of the shallow waters within the project area at the Oakland Touchdown and at Clipper Cove and the Coast Guard facility at YBI. Eelgrass provides important nursery habitat and protection for many fish and invertebrate species, including herring. In addition, avian species are often observed foraging among vegetated shallows.

Eelgrass is typically present on shallow, gradually sloping sand, sand/mud, and sand/shell debris habitats. Eelgrass beds stabilize shorelines by dampening the wave energy that transports sediment to and from the shore, preventing erosion. They also improve water quality by collecting and filtering organic matter and sediments. This filtering acts as a nutrient pump, transferring waterborne nutrients to the sediments and invertebrates. Eelgrass is easily affected by changes in water quality and turbidity. It is extremely dynamic, expanding and contracting by as much as several hectares per season, depending on the quality of the site. Consequently, eelgrass beds can serve as an indicator community for the overall health of an estuary.

Open Water

The SFOBB is located in the Central Bay segment of the San Francisco Bay Estuary. The Central Bay is generally marine in character with waters that are cold, saline, and low in total suspended sediment. This section of the estuary is strongly influenced by tidal currents, due to its proximity to the Pacific Ocean. Fish swim through the Central Bay on their way to and from the entrapment zone, an area in the northern part of the Bay where fresh water flows from the Delta mix with brackish water flows from the estuary, trapping sediment and phytoplankton in the water column.

Fisheries. Several species of anadromous, marine, and estuarine species use the Bay/Delta for part of their life cycle. Anadromous species in the Central Bay, such as the native chinook salmon (*Oncorhynchus tshawytscha*), migrate through the open water areas of the Bay on their way to and from the tributaries of the Delta. Many marine species commonly found along the Pacific coast are found in the San Francisco Bay, including commercially and recreationally important Pacific herring (*Clupea*

harengeus), and 15 species managed by federal fisheries management plans and provided protection under the Essential Fish Habitat regulations promulgated by the Magnuson-Stevens Act. (See Table 3.9-1 for a list of the managed species.)

Table 3.9-1 Managed Fish Species Found in Central San Francisco Bay

Common Name	Scientific Name	Abundance
Northern anchovy	*Engraulis mordax*	Primary
Pacific sardine	*Sardinops asgax caerulrus*	Tertiary
Chinook salmon	*Oncorhynchus tshawytscha*	Secondary
English sole	*Parophrys vetulus*	Primary
Pacific sanddab	*Citharichtys sordidus*	Primary
Rex sole	*Glyptocephalus zachirus*	Tertiary
Sand sole	*Psettichthys melanostictus*	Tertiary
Starry flounder	*Platichthys stallatus*	Secondary
Leopard shark	*Triakis semifasciata*	Secondary
Big skate	*Raja binoculata*	Tertiary
Spiny dogfish	*Squalis acanthias*	Tertiary
Brown rockfish	*Sebastes auriculatus*	Secondary
Calico rockfish	*Sebastes dallii*	Tertiary
Cabezon	*Scorpaenichttys marmoratus*	Tertiary
Lingcod	*Ophidodon elongatus*	Tertiary

Notes: Primary = Species readily identifiable and common (in at least 1 percent of catch).
Secondary = Readily identifiable to species and uncommon (in less than 1 percent of catch).
Tertiary = Identification questionable or uncommon or rare in catch.
Source: Biological Assessment, June 1999.

Plankton. Phytoplankton in the San Francisco Bay Estuary are consumed by organisms, including clams, worms, mussels, and shrimp-like zooplankton called copepods. Zooplankton, in turn, are consumed by a variety of fish species and are especially important to the survival of juvenile fish. Important species of zooplankton in the Central Bay include the ghost shrimp and the shrimp-like euphausiids, commonly known as krill. A combination of factors, including water depth and transparency, river inflow, and freshwater export from the Delta, influence the ability of phytoplankton to receive adequate light for photosynthesis. These factors influence the productivity and concentrations of phytoplankton throughout the various regions of the Bay. Phytoplankton levels in the Central Bay generally remain low due to the high degree of tidal water exchange and mixing. However, diatoms may become abundant in the Central and South Bays because of changes in micro and macro nutrients, turbidity, light penetration, water temperature, wave-action, cloudiness, tidal mixing, and filtering organisms.

Benthos. Benthic organisms are filter feeders that strain phytoplankton and detritus from the water column and graze on nutrients that fall to the bottom sediment. A broad range of species is commonly found in the Bay along intertidal flats, the bottom of open water areas, and on hard surfaces below the intertidal zone. Some benthic organisms,

such as worms, burrow into the bottom sediment and others, such as oysters, crabs, flat worms, and copepods, live on the sediment surface. Others, including mussels, live on hard surfaces such as rocks and pilings. Existing submerged bridge structures and rocky outcrops may provide substrate for benthic invertebrates, including the bay mussel.

3.9.4 Wetlands and Waters of the United States

Wetland resources in the project study area include "special aquatic sites" regulated by the Army Corps of Engineers (ACOE) under Section 404 of the federal Clean Water Act and Waters of the U.S. regulated under Section 10 of the Rivers and Harbors Act. Special aquatic sites found in the project area include non-tidal wetlands, tidal wetlands, sand flats, and eelgrass beds. A delineation of jurisdictional wetlands, as defined by the ACOE, was conducted in the project area. Potential jurisdictional wetlands were delineated in the field using methods outlined in the 1987 ACOE Wetland Delineation Manual.[30] Jurisdictional wetlands are defined when three conditions exist: 1) presence of hydric soils, 2) presence of saturated, inundated or ponded/flooded hydrologic conditions during the growing season, and 3) presence of hydrophytic vegetation. Special aquatic sites and waters of the U.S. in the project area are shown on Figures 3-19 and 3-20 in Appendix A. The following is a description of the wetlands, mudflats, eelgrass beds, and waters of the U.S. in the project area.

Wetlands

Wetlands possess unique functions and values that vary depending on the type of wetland, its size, surrounding land uses, and the degree to which it has been previously disturbed. Wetland functions are defined as the physical, chemical, and biological attributes of a wetland, such as flood storage, species habitat, or groundwater discharge. Other functions of wetlands may have specific "values" that are considered beneficial to society, such as groundwater recharge, recreation, or aesthetics. Each wetland type was evaluated separately to determine general wetland functions and values. The following are standard functions used to assess each wetland type:

- Wildlife diversity/abundance;
- Aquatic diversity/abundance; and
- Uniqueness/heritage.

The total area of jurisdictional wetlands in the project area is 0.07 hectare (0.18 acre).

There are five wetland sites in the project area. One tidal wetland site is a narrow strip located along the high tide line of Radio Point Beach. Approximately 0.01 hectare (0.03 acre) of this wetland is within the project area and another 0.01 hectare (0.03 acre) extends outside of the project area to the northeast. Vegetation in this area consists of saltgrass (*Distichlis spicata*) and searocket (*Cakile maritima)*, both hydrophytic plants that are considered wetland indicator species. This vegetation is

[30] Environmental Laboratory, *Corps of Engineers Wetlands Delineation Manual,* Technical Report Y-87-1, U.S. Army Engineer Waterways Experiments Station, 1987.

growing at or slightly above the high tide line. A muted tidal wetland occurs behind the foredune area outside of the project area (wetland sample point B-1 shown on Figure 3-20 in Appendix A). Two small non-tidal wetland areas occur within the project area on Port of Oakland property, located just south of the existing highway. One wetland area at this site is 0.03 hectare (0.07 acre) and includes rabbit foot grass (*Polypogon monspeliensis)*, a wetland indicator species. This site appears to have been recently used for construction staging and storage, and it is likely that the topographic depression was created by these activities. West of this site there is another non-tidal wetland area also located on Port of Oakland property. This wetland is 0.02 hectare (0.05 acre) and consists of wetland indicator species, including brass buttons (*Cotula coronopifolia*), sourclover (*Melitotus indica*), and rabbit foot grass.

Another small band of tidal wetlands occurs on the north side of YBI (see Figure 3-19 in Appendix A). This wetland band extends for approximately 90 meters (295 feet) along the high-tide line and is approximately 1 meter (3.28 feet) wide. The total wetland area is approximately 0.01 hectare (0.03 acre). Wetland vegetation in this area is comprised of pickleweed, fat hen (*Atriplex triangulars)*, and saltgrass. This wetland area is described as northern coastal salt marsh in Section 3.9.3 — Estuarine Environment and Associated Species.

""The tidal wetlands present in the project study area are predominantly remnant wetlands surrounded by non-native species. Compared to the tidal wetlands located in the Emeryville Crescent, tidal wetlands in the project area do not provide extensive habitat for wildlife and, therefore, their functions and values are limited. The non-tidal wetland areas are also characterized by limited functions and values due to human disturbance and lack of wetland species diversity. The non-tidal wetlands are unlikely to provide habitat for wildlife species.

Sand Flats

Sand flats were delineated and are present in the project area between the Mean High Water (MHW) line, elevation 0.8 meter (2.7 feet) NGVD, and the MLLW. The lower limits of the sand flats were determined from aerial photographs taken during approximately a –0.85 tide. The upper limits of the sand flats were determined in the field using GPS equipment.

Within the project area, sand flats occur along the north side of the Oakland Touchdown area at the eastern bridge abutment and east of the USCG station on YBI. Approximately 2.1 hectares (5.1 acres) of sand flats are located between Radio Point Beach and the eastern bridge abutment. These sand flat areas provide a moderate level of functions and values as foraging habitat for a variety of bird species. The functions and values of sand flats are discussed in more detail in Section 3.9.3 — Estuarine Environment and Associated Species.

Eelgrass (*Zostera marina L.*)

Preliminary surveys of eelgrass habitat in the project area were conducted in 1997 and 1998. More detailed surveys were conducted in 1999 and 2000 (a pre-construction

survey only for Replacement Alternative N-6).[31] Eelgrass beds were surveyed in the field during Mean Low Water (MLW) when the potential for observing the edge of eelgrass beds or individual stands is easiest. Fathometer surveys and bottom grab samples were taken when eelgrass was not visible from the water surface or when visibility was otherwise not suitable to determine eelgrass distribution. Eelgrass beds are present in the San Francisco Bay Estuary from Mean Lower Low Water (MLLW), elevation -0.9 meter (2.9 feet) National Geodetic Vertical Datum (NGVD), to 1.5 meters (5 feet) below MLW. Eelgrass survey methods included use of specialized acoustic (sonar) equipment to locate and map the occurrence of the eelgrass beds. Divers were used to verify the sonar readings, determine eelgrass bed density, and the density of the existing grass shoots.

Locations of eelgrass beds are shown on Figures 3-17 and 3-18 in Appendix A. The eelgrass beds in the project vicinity totaled approximately 16.4 hectares (40.6 acres) at the time of the October 1999 surveys. Approximately 0.7 hectares (1.8 acres) occur adjacent to YBI and approximately 15.7 hectares (38.8 acres) occur north of the Oakland Touchdown area.

The most extensive eelgrass beds were identified north of the Oakland Touchdown. The distribution of these eelgrass beds extends in depths ranging from about 1.1 to 1.5 meters (3.5 to 5.0 feet) and has exhibited dramatic fluctuations in size and density from year to year. Eelgrass beds in this area are patchy, occurring within 3.0 to 4.6 meters (10 to 15 feet) of each other. Approximately 2,493 individual eelgrass patches were recorded in this area during the 1999 surveys with patches varying from 1.5 to 3.6 meters (5 to 12 feet) in diameter.

Four eelgrass bed areas were identified near YBI, two within Clipper Cove on the north side of YBI, and two within Coast Guard Cove on the south side of YBI. Eelgrass beds in these areas occur along the edges of the shoreline and extend to areas no greater in depth than 1.1 to 1.5 meters (3.5 to 5.0 feet).

Eelgrass is easily affected by environmental factors such as changes in water quality and turbidity. This habitat type is extremely dynamic, expanding and contracting by as much as several hectares per season, depending on the quality of the site and environmental factors.

Waters of the U.S

Waters of the U.S. within the study area include "waters...that are subject to the ebb and flow of the tide shoreward to the Mean High Water mark" that are used to transport

[31] Caltrans completed a pre-construction survey for Replacement Alternative N-6. The physical survey was conducted in October 2000, with data generation and review being completed in January 2001. This survey has a limited purpose as opposed to prior surveys: it is a pre-construction survey intended to provide current data immediately prior to construction of a particular alternative to measure actual impacts to the greatest extent possible. Accordingly, this survey only covers the area impacted by Replacement Alternative N-6. Since the survey was not intended for the purposes of an alternatives analysis, it did not include areas impacted by other alternatives. As anticipated, the area occupied by the eelgrass beds at YBI and the Oakland Touchdown area has changed due to the natural annual variability in such beds. As the eelgrass beds have grown between 1999 and 2000, the overall percentage of area impacted has not changed to any appreciable degree.

interstate or foreign commerce, as described under Section 10 of the Rivers and Harbors Act (33 Code of Federal Regulation Part 322.2). The project area is bisected by a navigation opening that is under the jurisdiction of the USCG. Section 10 jurisdiction extends to the MHW mark on the north and south sides of the SFOBB. Section 404 jurisdiction extends to the High-tide Line (HTL) on the north and south sides of the bridge. Impacts to special aquatic sites, including sand flats and eelgrass beds, are regulated under Section 404 of the Federal Clean Water Act.

3.9.5 Jurisdiction of the Bay Conservation and Development Commission

Under the McAteer-Petris Act, the San Francisco Bay Conservation and Development Commission (BCDC) has jurisdiction over all areas of the Bay that are subject to tidal action. BCDC's San Francisco Bay jurisdiction includes subtidal areas, intertidal areas, and tidal marsh areas that are between mean high tide and 1.5 meters (5 feet) above mean sea level. In addition, BCDC has jurisdiction over a 30.5-meter (100-foot) shoreline band surrounding the Bay from the mean high tide line. For the SFOBB project, the area subject to BCDC jurisdiction includes the shoreline on YBI and on the Oakland Touchdown. BCDC's jurisdiction does not extend to federally owned areas such as the Navy or USCG property on YBI, because they are excluded from state coastal zones pursuant to the Coastal Zone Management Act.

3.9.6 Plants and Wildlife

This section identifies special status plant and wildlife species protected under the federal and state Endangered Species Acts with potential to occur in the vicinity of the project area, as documented by lists compiled from various sources. Based on those lists, surveys of the habitat in the project area were conducted, and consultations with biologists were completed to identify specific species and habitats potentially impacted by the project alternatives. Many of the species identified through these sources have the potential to occur within the greater regional area but are not present within the project area due to the lack of suitable habitat. This section also identifies certain wildlife species that are known to occur within the project area and are protected by the Migratory Bird Treaty Act, the Magnuson-Stevens Act, or the Marine Mammal Protection Act. Tables 3.9-2 and 3.9-3, at the end of this section, provide a comprehensive list of the species discussed below.

Plants

A list of special status plant species, shown in Table 3.9-2, contains 42 species that have the potential to occur in the East Span Project area. This list was compiled based on the list of species provided by U.S. Fish and Wildlife Service (USFWS) in its letter of August 29, 1997 (see Appendix G for a copy of the letter), a literature review, a review of the California Natural Diversity Database (CNDDB), and California Native Plant Society's (CNPS's) Inventory Database. The CNPS is an independent organization that reviews and maintains information on rare native plants in California. In an effort to categorize degrees of concern for rare plants, the CNPS developed four lists which indicate rarity and status descriptions of endangered plants. The first two categories, List 1B and List 2, indicate plants that could qualify for listing as rare, threatened, or

endangered. List 3 includes plants for which more information is needed to classify them. The List 4 category includes plants of limited distribution that are considered important species locally.

Surveys for plants were conducted in Fall 1997 and Spring 1998 to assess the known and potential occurrence of threatened and endangered species. Survey dates were selected to optimize the likelihood of observing target species during their blooming period. While plant species have the potential to occur in the project area, results of the surveys indicate that only the marsh gumplant occurs in the project area. A brief description of the marsh gumplant is provided below.

Marsh Gumplant (*Grindelia stricta*). Marsh gumplant is included on List 4 of the CNPS Inventory. It has no federal or state status; however, it is considered to be locally significant and has been included in the CNPS list of species which have limited distribution (List 4). This species was observed during botanical surveys on the northern portion of the YBI and the Oakland Touchdown.

Wildlife

A list of special status species and their legal status are provided in Table 3.9-3. This table contains species that could possibly be found in the vicinity of the East Span Project area. These species were compiled based on the list of species provided by the USFWS and NMFS, a literature review, and a review of the CNDDB. Only the wildlife species described below have the potential to occur in the project area because suitable or marginally suitable supporting habitat is present. All migratory bird species such as western gulls, peregrine falcons, and double-crested cormorants are protected by the Migratory Bird Treaty Act.

Surveys for wildlife and aquatic species were not conducted for this project, given the availability of information from previous studies, including avian surveys, entomology field surveys, reptile and amphibian surveys, and marine mammal studies. A brief description of wildlife species known to occur in the project area is provided below.

Harbor Seal (*Phoca vitulina*). Harbor seals are protected from harassment under the Federal Marine Mammal Protection Act of 1972, as amended. Foraging sites are generally close to shore where medium-sized fish in addition to bivalves, crab, octopus, herring, and squid are taken as prey. Harbor seals use the south side of YBI as a haul-out site year-round. This site is located approximately 305 meters (1,000 feet) from the nearest construction limit boundary.

California Sea Lion (*Zalophus californianus*). Like the harbor seal, the California sea lion is protected by the Federal Marine Mammal Protection Act. While little information is available on the foraging patterns of California sea lions in the Bay, individual sea lions have been observed on a fairly regular basis in the shipping channel to the south of YBI. Individuals have also been sighted in the waters east of YBI. Pier 39 in San Francisco, about 6 kilometers (4 miles) from the project site, has become a haul-out site for sea lions. Most of the sea lions hauled out at this site are males and no pupping has been observed.

Gray Whale (*Eschrichtius robustus*). Protected under the Marine Mammal Protection Act, the gray whale has been sighted more frequently in recent years in San Francisco Bay. Reduced food supply in the Bering Sea has been suspected as the most probable cause. Sightings have included areas off Sausalito in Richardson Bay and the tip of the Tiburon Peninsula (approximately 11 kilometers [7 miles] northwest of the project area) and as far south as the San Bruno Shoals area (approximately 23 kilometers [14 miles] southwest of the project area). Gray whales have been observed foraging in these areas. Observations have typically been during the months from December to March, during their winter migration north to Alaska and the Bering Straits.

American Peregrine Falcon (*Falco peregrinus anatum*). Two pairs of peregrine falcons nest and roost on the SFOBB. One pair nests on the West Span and one pair on the East Span. Courtship behavior and other nesting activities can begin as early as December for these pairs. Eggs are usually laid in early March, and the young generally fledge in the third week of May. This species has been removed from federal listing, but is still protected by the Migratory Bird Treaty Act and the California Endangered Species Act (CESA).

Saltmarsh Common Yellowthroat (*Geothlypis trichas sinuosa*). The saltmarsh common yellowthroat inhabits fresh and brackish wetland areas as well as upland habitat throughout the San Francisco Bay Area. Saltmarsh common yellowthroats use the Emeryville Crescent as wintering habitat. Observations of three individuals perched on marsh gumplant (*Grindelia stricta*) located adjacent to the SFOBB Toll Plaza were made in December 1989 by Caltrans. The saltmarsh common yellowthroat is a species of concern under the State and Federal Endangered Species Acts.

Alameda Song Sparrow (*Melospiza melodia pusillula*). The Alameda song sparrow prefers fresh, brackish, and salt marsh habitats. Alameda song sparrow occurs in coastal salt marsh habitat at the Emeryville Crescent, adjacent to the SFOBB Toll Plaza. There have been no observations of the Alameda song sparrow nesting in the project area; however, marsh gumplant, which occurs on the north side of the Oakland Touchdown and the YBI, may provide nesting habitat for the Alameda song sparrow. The Alameda song sparrow has been observed perching on individual gumplants within the project area. The Alameda song sparrow is designated as a species of concern under the Federal Endangered Species Act. The CESA does not address the Alameda song sparrow.

Double-crested Cormorant (*Phalacrocorax auritus*). This species breeds in dense colonies that can be found on rocky coasts and offshore islands, as well as on inland lakes and rivers. Cormorants have the ability to nest at any time during the breeding season if the first nesting attempt is unsuccessful. Therefore, nests may be active any time between March and September. Double-crested cormorants have nested on the East Span of the SFOBB since 1984. The colony of double-crested cormorants includes 400 to 600 nesting pairs and represents the second-largest colony in Northern California. The highest concentrations of nesting pairs occur between

Columns E5 and E15. The double-crested cormorant is designated as a species of special concern under the CESA.

California Brown Pelican (*Pelecanus occidentalis californicus*). The California brown pelican is known to rest on bridge footings and forage within the project area. No known nest sites occur in the project area. The California brown pelican is listed as endangered under both the State and Federal Endangered Species Acts.

Allen's hummingbird *(Selasphorus sasin).* Allen's hummingbird nests in riparian, eucalyptus and cypress groves, evergreen, redwood, bushop pine forests and coastal scrub. It is found in the Bay Area from late January through July. Nesting habitat exists in the northern coastal scrub on YBI. This species is listed as a federal species of concern.

White-tailed kite *(Elanus leucurus).* White-tailed kites are present year-round in the Bay Area, although the population increases from September through May. Kites forage in low marsh vegetation, riparian grasslands, and agricultural areas and nest in moderately tall trees such as oaks and willows. Potential nesting habitat is present in the coast live oak woodland on YBI and foraging habitat is present in the Emeryville Crescent, outside of the project area. This species is listed as a federal and state species of concern.

American bittern *(Botaurus lentiginosus).* American bitterns are rare breeders in the Bay; there are no definitive breeding records for brackish and saltwater marshes in coastal California. They forage in cattail and tule marshes and other dense marsh vegetation. Dense marsh vegetation exists within the Emeryville Crescent, outside the project area. This species is listed as a federal species of concern.

Common loon *(Gavia immer).* The common loon nests in freshwater marshes, although it also forages and roosts in marine environments. This species has the potential to occur close to the Oakland. This species is listed as a federal and state species of concern.

Long-billed curlew *(Numenius americanus).* The long-billed curlew is a shorebird that is a federal species of concern. It does not breed in the Bay area, but it winters here. It is primarily a coastal species and is found in marshes and beaches. Therefore it could potentially forage in the project area.

Bank swallow *(Riparia riparia).* The bank swallow nests on rocky crags and cliffs. It breeds in California from late March to early May and is a rare winter visitor. Potential habitat for this species may be present along the slopes of YBI. This species is federally protected under the Migratory Bird Treaty Act and is listed as a state species of concern.

Elegant tern (*Sterna elegans).* The elegant tern nests in the Gulf of California, Baja California and southern California. It is a coastal bird and is frequently found in bays and esturaries. This species has the potential to occur in the project area along

the sand flats on the Oakland Touchdown. This species is listed as a federal and state species of concern.

Bewick's Wren *(Thryomanes bewickii).* Bewick's Wren, a federal species of concern, breeds in suburban environments, farms, shrubland and open woodlands. It tends to occur in a variety of dense, shrubby habitats, including coastal scrub habitats. It can be found year round in the Bay area. It has the potential to occur in the project area.

Western Snowy Plover (*Charadrius alexandrinus nivosus*). The western snowy plover is a small shorebird with pale coloration, making it almost completely camouflaged against a sandy background. This species remains in the state year-round where it populates open beach and coastal marsh areas. Snowy plovers have been designated as a threatened species under the Federal Endangered Species Act. The CESA includes the western snowy plover as a species of concern.

Appropriate breeding habitat for this species does not exist in the project area. The species forages over mudflats and sand flats. Sand flats are present in the area of the Oakland Touchdown for the northern alternatives (Figure 3-18 of Appendix A). Snowy plovers have not been observed in the project area.

Western Gull (*Larus occidentalis*). The western gull is protected under the Migratory Bird Treaty Act. Western gulls nest on the column footings of the SFOBB West Span and have the potential to nest on the footings of the East Span.[32]

Black-crowned Night Heron (*Nycticorax nycticorax*). The black-crowned night heron is protected under the Migratory Bird Treaty Act. The night heron nest and roost on YBI woodland. This species usually nests between February and July; however, it is unknown which trees might be used for nesting from year to year.

California Clapper Rail (*Rallus longirostris obsoletus*). The California clapper rail is a year-round resident of coastal salt marshes. Individuals hide their nests among a canopy of wetland vegetation dominated by pickleweed and cordgrass. This species is known to occur in the Emeryville Crescent area, located outside the study area. Appropriate nesting and foraging habitat does not exist in the study area. Both the State and Federal Endangered Species Acts include the clapper rail as an endangered species.

California Least Tern (*Sterna antillarum browni*). The California least tern nests in colonies on bare or sparsely vegetated areas near the coast. This species is found in the Bay Area during the breeding season from May through August. Nesting habitat which supports the California least tern does not occur within the study area. The California least tern is designated as an endangered species under both the State and Federal Endangered Species Acts.

[32] Caltrans, Letter from a Caltrans District 4 biologist regarding Western Gulls, July 1998.

Shorebirds. Shorebirds that are known to occur in the project area include western sandpiper (*Calidris mauri*) and black-bellied plover (*Pluvialis squatarola*). A strip of uplands at the former Oakland Army Base property located on the south side of the Oakland Touchdown is known to provide winter roosting habitat for shorebirds during high tides. As a result of development around the Central Bay, limited upland resting areas remain available for shorebird use during the winter season.

Central Valley and Central California-Coast Steelhead (*Oncorhynchus mykiss*). Steelhead, the anadromous form of rainbow trout, inhabit the Sacramento, Stanislaus, Tuolumne, and Merced Rivers and the mainstem of the San Joaquin River. The life history of steelhead is similar to that of chinook salmon, with two major differences. First, steelhead do not necessarily die after spawning, thus maintaining their ability to return to the Pacific Ocean after spawning in fresh water. Second, juvenile steelhead may spend up to four years residing in fresh water prior to migrating to the ocean as smolts. Typically, Sacramento steelhead migrate through San Francisco Bay and the Sacramento-San Joaquin Estuary from November through May after one year in fresh water.

Steelhead populations in the Central California Coast ESU (Evolutionary Significant Unit) and California Central Valley ESU have been listed by the NMFS as threatened under the Federal Endangered Species Act (62 No. 159). Steelhead migration periods are similar to the winter-run chinook salmon which inhabit shallow water habitat during foraging.

Winter-run, Fall-run, Spring-run Chinook Salmon (*Oncorhynchus tshawytscha*). Chinook salmon are anadromous, spending three to five years at sea before returning to fresh water to spawn. San Francisco Bay serves as a conduit through which adult salmon must pass to reach their upstream spawning grounds. Additionally, juvenile smolt salmon utilize the Bay as a migration corridor to reach the Pacific Ocean. Smoltification is the physiological acclimation of juvenile salmon to full-strength sea water which occurs after completion of the freshwater rearing phase. The chinook salmon population in San Francisco Bay and the Sacramento-San Joaquin Estuary is comprised of four races: fall-run, late fall-run, spring-run and winter-run. In addition, there are two Evolutionary Significant Units (ESUs), the Sacramento River ESU and the Central Valley ESU. Each of these spawning populations is distinguished based on the timing of adult upstream migration, spawning, and juvenile downstream migration. The Sacramento River winter-run ESU is federally listed as endangered, the Central Valley spring-run ESU is listed as federally threatened, and the Central Valley fall-run and late fall-run are listed as proposed threatened.

The federally endangered Sacramento River winter-run adult chinook salmon ESU migrates through San Francisco Bay and the Sacramento-San Joaquin River Estuary from December through April. Spawning is confined to the mainstem Sacramento River and occurs from mid-April through mid-July, peaking in May and June. Winter-run fry emerge from the gravel from July through October and rear to smoltification in the Sacramento River upstream from the Delta. However, in years of high Delta outflow, fry may migrate to the estuary. Generally, the period of peak outmigration through San Francisco Bay and the Sacramento-San Joaquin Estuary is between

January and April. The area of designated winter-run critical habitat includes all of San Francisco Bay north of the SFOBB.

The federally threatened and proposed endangered Central Valley spring-run chinook salmon ESU enters the Sacramento River from March to July and spawns from late August through early October, with a peak in September. The area of designated winter-run critical habitat includes all waters of San Pablo Bay westward of the Carquinez Bridge and all waters of San Francisco Bay (north of the SFOBB) from San Pablo Bay to the Golden Gate Bridge.

The proposed threatened Central Valley fall-run and late fall-run chinook salmon ESU enters the Sacramento and San Joaquin Rivers from July through April and spawns from October through February. Both runs exhibit an ocean-type life history, migrating as fry, subyearlings, and yearlings. Winter-run, spring-run, and fall-run chinook salmon have the potential to occur in the study area.

Green Sturgeon (*Acipenser medirostris*) and Longfin Smelt (*Sprinchus thaleichtys*). Habitat for the green sturgeon and longfin smelt does not occur in the project study area; however, it has the potential to occur during years of high amounts of rain. The green sturgeon is a species of special concern under the CESA. Its standing under the federal act is similar and the species is identified as a species of concern.

Pacific Herring (*Clupea pallasi*). Pacific herring is a small schooling marine fish which enters estuaries and bays to spawn. Pacific herring is both a popular sport fish and a commercially important species and as such is protected under the Magnuson-Stevens Act. Adult Pacific herring are seasonally abundant from October to March (the spawning season), and juvenile herring may linger in San Francisco Bay for several months after hatching. Large pre-spawning aggregations can be found in the deepwater channels of the central San Francisco Bay. Pacific herring then move into shallower areas to spawn.

Pacific herring are known to spawn throughout the intertidal and subtidal habitats within the vicinity of the project area, including eelgrass beds, on intertidal riprap along the shoreline, pilings, and seaweed, the Oakland harbor area, Alameda Island, and all around Treasure Island and YBI.

Early life stages of herring development are sensitive to environmental and human-induced stress, including non-suitable levels of water temperature, salinity, dissolved oxygen concentrations, suspended sediments, toxic contaminants, and sound pressure waves.

Table 3.9-2 Special Status Plant Species Potentially Occurring in the Vicinity of the SFOBB East Span Seismic Safety Project (Page 1 of 7)

***Species* and Common Name**	**Status**			**Flowering Period**	**Potential for Occurrence[e]**
	Federal[a]	**State[b]**	**CNPS[c] R-E-D[d]**		
Amsinckia grandiflora large-flowered fiddleneck	E	E	1B 3-3-3	April-May	Not present; no supporting habitat
Arabis blepharophylla coast rock cress	--	--	4 1-1-3	Feb.-April	Not present; no supporting habitat
Arctostaphylos hookeri ssp. *ravenii* Presidio manzanita	E	E	1B 3-3-3	Feb.-March	Not present; no supporting habitat
Arctostaphylos hookeri ssp. *franciscana* San Francisco manzanita	SC	--	1A none	Feb.-April	Not present; no supporting habitat
Arctostaphylos pallida pallid manzanita	T	E	1B 3-3-3	Dec.-March	Not present; no supporting habitat
Arctostaphylos tomentosa ssp. *rosei* shaggy-barked manzanita	--	--	Proposed listing	Dec.-March	Not present; no supporting habitat
Arenaria paludicola marsh sandwort	E	E	1B 3-3-2	May-August	Not present; no supporting habitat
Astragalus tener var. *tener* alkali milk-vetch	SC	--	1B 3-2-3	March-June	Not present; no supporting habitat
Atriplex cordulata heartscale	SC	--	1B 2-2-3	May-October	Not present; no supporting habitat
Atriplex depressa brittlescale	SC	--	1B 2-2-3	May-October	Not present; no supporting habitat
Atriplex joaquiniana valley spearscale	SC	--	1B 2-2-3	April-Sep.	Not present; no supporting habitat

Abridged Notes:
Federal and State: **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** - Proposed Threatened; **SC** - Species of Concern; **C** – Candidate; **--** - Not listed.
CNPS: **1B** - Rare, threatened, or endangered in California and elsewhere; **2** - Rare, threatened, or endangered in California, but more common elsewhere; **3** - More information is needed to assign them to another list or to reject them from being listed; **4** - Limited distribution in California.
R-E-D: Three classes or degrees of concern, 1, 2, or 3 (higher numbers indicate greater concern): **Rarity** - extent of the plant's distribution and number of individuals; **Endangerment** - plant's vulnerability to extinction; **Distribution** - overall range of the plant.

Table 3.9-2 Continued (Page 2 of 7)

***Species* and Common Name**	**Status**			**Flowering Period**	**Potential for Occurrence[e]**
	Federal[a]	**State[b]**	**CNPS[c] R-E-D[d]**		
Carex comosa bristly sedge	--	--	2 3-3-1	May-Sep.	Not present; no supporting habitat
Chorizanthe cuspidata var. *cuspidata* San Francisco Bay spineflower	SC	--	1B 2-2-3	April-July	Unlikely; not observed during surveys
Chorizanthe robusta var. *robusta* robust spineflower	E	--	1B 3-3-3	May-Sep.	Unlikely; not observed during surveys
Cirsium fontinale var. *campylon* Mt. Hamilton thistle	SC	--	1B 2-2-3	April-Oct.	Not present; no supporting habitat
Cirsium occidentale var. *compactum* compact cobweb thistle	SC	--	1B 2-2-3	April-June	Not present; no supporting habitat
Clarkia concinna ssp. *automixa* South Bay clarkia	SC	--	4 1-1-3	April-July	Not present; no supporting habitat
Collinsia corymbosa round-headed Chinese houses	--	--	1B 2-2-3	April-June	Not present; no supporting habitat
Clarkia franciscana Presidio clarkia	E	E	1B 3-3-3	May-July	Not present; no supporting habitat
Collinsia multicolor San Francisco collinsia	--	--	4 1-1-3	March-May	Not present; marginal habitat present
Cordylanthus maritimus ssp. *palustris* Pt. Reyes bird's beak	SC	--	1B 2-2-3	April-May	Unlikely; not observed during surveys
Cordylanthus mollis ssp. *hispidus* hispid bird's-beak	SC	--	1B 2-3-3	June-Sep.	Not present; no supporting habitat

Abridged Notes:
Federal and State: **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** - Proposed Threatened; **SC** - Species of Concern; **C** – Candidate; **--** - Not listed.
CNPS: **1B** - Rare, threatened, or endangered in California and elsewhere; **2** - Rare, threatened, or endangered in California, but more common elsewhere; **3** - More information is needed to assign them to another list or to reject them from being listed; **4** - Limited distribution in California.
R-E-D: Three classes or degrees of concern, 1, 2, or 3 (higher numbers indicate greater concern): **Rarity** - extent of the plant's distribution and number of individuals; **Endangerment** - plant's vulnerability to extinction; **Distribution** - overall range of the plant.

Table 3.9-2 Continued (Page 3 of 7)

Cordylanthus palmatus palmate-bracted bird's-beak	E	E	1B 3-3-3	May-Oct.	Not present; no supporting habitat
Deinandra bacigalupii Livermore tarplant	SC	--	1B 3-2-3	June-Nov.	Not present; no supporting habitat
Delphinium californicum ssp. *interius* interior California larkspur	SC	--	1B 3-2-3	April-June	Not present; no supporting habitat
Delphinium recurvatum recurved delphinium	SC	--	1B 2-2-3	March-May	Not present; no supporting habitat
Erysimum franciscanum San Francisco wallflower	SC	--	4 1-2-3	March-June	Not present; no supporting habitat
Eschscholzia rhombipetala diamond-petaled poppy	SC	--	1B 3-3-3	March-April	Not present; no supporting habitat
Fritillaria falcata talus fritillary	SC	--	1B 3-2-3	March-May	Not present; no supporting habitat
Fritillaria lilacea fragrant fritillary	SC	--	1B 1-2-3	Feb.-April	Not present; no supporting habitat
Gilia capitata ssp. *chamissonis* dune gilia	--	--	Proposed listing	May-July	Unlikely; not observed during surveys
Gilia millefoliata many-stemmed gilia	--	--	Proposed listing	April-June	Not present; marginal habitat present
Grindelia hirsutula var. *maritima* San Francisco gumplant	SC	--	1B 2-2-3	Aug.-Sep.	Unlikely; not observed during surveys
Grindelia stricta var. *angustifolia* marsh gumplant	--	--	4 1-1-3	Aug.-Oct.	Present
Helianthella castanea Diablo rose-rock	SC	--	1B 3-2-3	April-June	Not present; no supporting habitat

Abridged Notes:
Federal and State: **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** - Proposed Threatened; **SC** - Species of Concern; **C** – Candidate; **--** - Not listed.
CNPS: **1B** - Rare, threatened, or endangered in California and elsewhere; **2** - Rare, threatened, or endangered in California, but more common elsewhere; **3** - More information is needed to assign them to another list or to reject them from being listed; **4** - Limited distribution in California.
R-E-D: Three classes or degrees of concern, 1, 2, or 3 (higher numbers indicate greater concern): **Rarity** - extent of the plant's distribution and number of individuals; **Endangerment** - plant's vulnerability to extinction; **Distribution** - overall range of the plant.

Table 3.9-2 Continued (Page 4 of 7)

***Species* and Common Name**	**Status**			**Flowering Period**	**Potential for Occurrence[e]**
	Federal[a]	**State[b]**	**CNPS[c] R-E-D[d]**		
Hemizonia parryi ssp. *congdonii* pappose spikeweed	SC	--	1B 3-3-3	June-November	Not present; no supporting habitat
Hesperolinon congestum Marin dwarf-flax	T	T	1B 3-3-3	May-July	Not present; no supporting habitat
Holocarpha macradenia Santa Cruz tarplant	T	E	1B 2-3-3	June-Oct.	Unlikely; not observed during surveys
Horkelia cuneata ssp. *sericea* Kellogg's horkelia	SC		1B 3-3-3	April-Sep.	Unlikely; not observed during surveys
Lasthenia conjugens Contra Costa goldfields	E	--	1B 3-3-3	March-June	Not present; no supporting habitat
Lathyrus jepsonii var. *jepsonii* delta-tule pea	SC	--	1B 2-2-3	May-June	Not present; no supporting habitat
Layia carnosa beach layia	E	E	1B 3-3-3	May-July	Not present; no supporting habitat
Lessingia germanorum San Francisco lessingia	E	E	1B 3-3-3	Aug.-Nov.	Unlikely; not observed during surveys
Lilaeopsis masonii Mason's lilaeopsis	SC	Rare	1B 2-3-3	April-Oct.	Not present; no supporting habitat
Lilium maritimum coast lily	SC	--	1B 2-3-3	May-July	Not present; no supporting habitat
Linanthus grandiflorus large-flowered linanthus	--	--	4 1-2-3	April-July	Not present; no supporting habitat
Microseris paludosa marsh microseris	--	--	Proposed listing	May-June	Not present; marginal habitat present

Abridged Notes:
Federal and State: **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** - Proposed Threatened; **SC** - Species of Concern; **C** – Candidate; **--** - Not listed.
CNPS: **1B** - Rare, threatened, or endangered in California and elsewhere; **2** - Rare, threatened, or endangered in California, but more common elsewhere; **3** - More information is needed to assign them to another list or to reject them from being listed; **4** - Limited distribution in California.
R-E-D: Three classes or degrees of concern, 1, 2, or 3 (higher numbers indicate greater concern): **Rarity** - extent of the plant's distribution and number of individuals; **Endangerment** - plant's vulnerability to extinction; **Distribution** - overall range of the plant.

Table 3.9-2 Continued (Page 5 of 7)

Species and Common Name	Status			Flowering Period	Potential for Occurrence[e]
	Federal[a]	State[b]	CNPS[c] R-E-D[d]		
Monardella undulata curly-leaved monardella	--	--	4 1-2-3	May-July	Unlikely; not observed during surveys
Myosurus minimus ssp. *apus* little mousetail	SC	--	3 2-3-2	March-June	Not present; no supporting habitat
Phacelia phacelioides Mt. Diablo phacelia	SC	--	1B 3-2-3	April-May	Not present; no supporting habitat
Piperia michaelii Michael's rein orchid	--	--	4 1-2-3	May-Aug.	Not present; marginal habitat present
Plagiobothrys chorisianus var. *chorisianus* Choris's popcorn flower	--	--	3 2-2-3	April-June	Not present; no supporting habitat
Plagiobothrys diffusus San Francisco popcornflower	SC	E	1B 3-3-3	April-June	Not present; no supporting habitat
Sanicula maritima adobe sanicle	SC	SC	1B 3-3-3	April-May	Not present; no supporting habitat
Sidalcea hickmanii ssp. *viridis* Marin checkermallow	SC	--	1B 3-1-3	May-June	Not present; no supporting habitat
Silene verecunda ssp. *verecunda* Mission Dolores campion	SC	--	1B 3-2-3	March-June	Unlikely; not observed during surveys
Streptanthus albidus ssp. *peramoenus* most beautiful (uncommon) jewelflower	SC	--	1B 2-2-3	April - June	Not present; no supporting habitat

Abridged Notes:
Federal and State: **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** - Proposed Threatened; **SC** - Species of Concern; **C** – Candidate; **--** - Not listed.
CNPS: **1B** - Rare, threatened, or endangered in California and elsewhere; **2** - Rare, threatened, or endangered in California, but more common elsewhere; **3** - More information is needed to assign them to another list or to reject them from being listed; **4** - Limited distribution in California.
R-E-D: Three classes or degrees of concern, 1, 2, or 3 (higher numbers indicate greater concern): **Rarity** - extent of the plant's distribution and number of individuals; **Endangerment** - plant's vulnerability to extinction; **Distribution** - overall range of the plant.

Table 3.9-2 Continued (Page 6 of 7)

Suaeda californica California suaeda	E	--	1B 3-3-3	July-Oct.	Unlikely; not observed during surveys
Trifolium amoenum showy Indian clover	E	--	1B 3-3-3	April-June	Not present; no supporting habitat
Triphysaria floribunda San Francisco owl's-clover	SC	--	1B 2-2-3	April-May	Not present; no supporting habitat
Tropidocarpum capparideum caper-fruited tropidocarpum	SC	--	1A --	March-April	Not present; no supporting habitat

Source: Caltrans, April 2001.

Abridged Notes:
Federal and State: **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** - Proposed Threatened; **SC** - Species of Concern; **C** – Candidate; **--** - Not listed.
CNPS: **1B** - Rare, threatened, or endangered in California and elsewhere; **2** - Rare, threatened, or endangered in California, but more common elsewhere; **3** - More information is needed to assign them to another list or to reject them from being listed; **4** - Limited distribution in California.
R-E-D: Three classes or degrees of concern, 1, 2, or 3 (higher numbers indicate greater concern): **Rarity** - extent of the plant's distribution and number of individuals; **Endangerment** - plant's vulnerability to extinction; **Distribution** - overall range of the plant.

Table 3.9-2 Continued (Page 7 of 7)

Abbreviations:

[a] Federal

E - Listed as endangered under the Federal Endangered Species Act.
T - Listed as threatened under the Federal Endangered Species Act.
PE - Proposed as endangered under the Federal Endangered Species Act.
PT - Proposed as threatened under the Federal Endangered Species Act.
SC - Federal species of concern; USFWS lacks sufficient information to support a listing proposal.
C - Candidate species; USFWS has on file enough information to propose listing as endangered or threatened.
-- - Not listed.

[b] State

E - Listed as endangered under the California Endangered Species Act.
T - Listed as threatened under the California Endangered Species Act.
PE - Proposed as endangered under the California Endangered Species Act.
PT - Proposed as threatened under the California Endangered Species Act.
SC - California species of special concern.
-- - Not listed.

[c] California Native Plant Inventory Status (CNPS)

List 1B - Plants that are rare, threatened, or endangered in California and elsewhere.
List 2 - Plants that are rare, threatened, or endangered in California, but more common elsewhere.
List 3 - Plants about which more information is needed to assign them to another list or to reject them from being listed.
List 4 - Plants that are of limited distribution in California.

[d] R-E-D Code

This code is divided into three classes or degrees of concern, represented by the number 1, 2, or 3 (higher numbers indicate greater concern):

Rarity - addresses the extent of the plant's distribution and number of individuals.
Endangerment - addresses the plant's vulnerability to extinction.
Distribution - addresses overall range of the plant.

[e] Potential for Occurrence

Unlikely; not observed during surveys - suitable habitat for this species was identified in the project area; however, no observations were made during 1997 fall and 1998 spring surveys.
Present - plants of this species were found during surveys or are known to be present in the project area from literature reviews.
Not present; no supporting habitat - habitat that would support the presence of this species is not present in the project area.
Not present; marginal habitat present - marginal habitat that could support this species was found in the project area.

Table 3.9-3 Special Status Wildlife Species, Critical Habitat, and Economically Important Fish Potentially Occurring in the Vicinity of the SFOBB East Span Seismic Safety Project (Page 1 of 15)

Species and Common Name	Status		Potential for Occurrence[c]
	Federal[a]	State[b]	
MARINE MAMMALS			
Arctocephalus townsendi Guadalupe fur seal	T	T	Not present; no supporting habitat
Balaenoptera borealis sei whale	E	--	Not present; no supporting habitat
Balaenoptera musculus blue whale	E	--	Not present; no supporting habitat
Balaenoptera physalus finback whale	E	--	Not present; no supporting habitat
Eschrichtius robustus gray whale	D, MMPA	--	Present in increasing numbers December to March near Richardson Bay and the Tiburon Peninsula
Eubalaena glacialis right whale	E	--	Not present; no supporting habitat
Eumetopias jubatus Steller sea lion	T	--	Unlikely to occur; no known occurrences in vicinity of project area
Eumetopias jubatus Steller sea lion critical habitat	T	--	Critical habitat is located in San Francisco County, but not in project area and species is not known to occur in vicinity of project area
Megaptera novaeangliae humpback whale	E	--	Not present; no supporting habitat

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 2 of 15)

Species and Common Name	Status		Potential for Occurrence[c]
	Federal[a]	State[b]	
Phoca vitulina harbor seal	MMPA	--	Present; haul-out site located 305 meters (1,000 feet) from nearest temporary construction limit
Physeter catodon sperm whale	E	--	Not present; no supporting habitat
Zalophus Californiaus California sea lion	MMPA	--	Present; haul-out site located 6 kilometers (4 miles) from project site
MAMMALS			
Corynorhinus townsendii townsendii Pacific western big-eared bat	SC	SC	Not present; no supporting habitat
Dipodomys heermanni berkeleyensis Berkeley kangaroo rat	SC	--	Not present; no supporting habitat
Eumops perotis californicus greater western mastiff-bat	SC	SC	Not present; no supporting habitat
Myotis ciliolabrum small-footed myotis bat	SC	--	Not present; no supporting habitat
Myotis evotis long-eared myotis bat	SC	SC	Not present; no supporting habitat
Myotis thysanodes fringed myotis bat	SC	SC	Not present; no supporting habitat
Myotis volans long-legged myotis bat	SC	SC	Not present; no supporting habitat

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 3 of 15)

***Species* and Common Name**	**Status**		**Potential for Occurrence[c]**
	Federal[a]	**State[b]**	
Myotis yumanensis Yuma myotis bat	SC	SC	Not present; no supporting habitat
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	SC	SC	Not present; no supporting habitat
Neotoma fuscipes riparia San Joaquin Valley woodrat	E	SC	Not present; no supporting habitat
Perognathus inornatus inornatus San Joaquin pocket mouse	SC	SC	Not present; no supporting habitat
Plecotus townsendii townsendii Pacific western big-eared bat	SC	SC	Not present; no supporting habitat
Reithrodontomys raviventris salt marsh harvest mouse	E	E	Not present; no supporting habitat
Scapanus latimanus parvus Alameda Island mole	SC	SC	Not present; no supporting habitat
Sorex vagrans halicoetes salt marsh vagrant shrew	SC	SC	Not present; no supporting habitat
Sylvilagus bachmani riparius riparian brush rabbit	E	E	Not present; no supporting habitat
Vulpes macrotis mutica San Joaquin kit fox	E	T	Not present; no supporting habitat

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 4 of 15)

***Species* and Common Name**	**Status**		**Potential for Occurrence[c]**
	Federal[a]	**State[b]**	
Aquila chrysaetos golden eagle	--	SC	Not present; no supporting habitat
BIRDS			
Agelaius tricolor tricolored blackbird	SC	SC	Not present; no supporting habitat
Ammodramus savannarum grasshopper sparrow	SC	--	Not present; no supporting habitat
Amphispiza belli belli Bell's sage sparrow	SC	SC	Not present; no supporting habitat
Asio flammeus short-eared owl	SC	SC	Not present; no supporting habitat
Athene cunicularia hypugea burrowing owl	SC	SC	Not present; no supporting habitat
Botaurus lentiginosus American bittern	SC	--	Potential to occur; rare breeder in the Bay, although roosting habitat is present within the Emeryville Crescent, outside the project area
Branta canadensis leucopareia Aleutian Canada goose	D	--	Not present; no supporting habitat
Buteo regalis ferruginous hawk	SC	SC	Not present; no supporting habitat
Calypte costae Costa's hummingbird	SC	--	Not present; no supporting habitat

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 5 of 15)

***Species* and Common Name**	**Status**		**Potential for Occurrence[c]**
	Federal[a]	**State[b]**	
Carduelis lawrencei Lawrence's goldfinch	SC	--	Not present; no supporting habitat
Chaetura vauxi Vaux's swift	SC	SC	Not present; no supporting habitat
Charadrius alexandrinus nivosus western snowy plover	T	SC	Unlikely to occur; feeding habitat along Oakland Touchdown, suitable nesting habitat not present
Charadrius montanus mountain plover	PT	SC	Not present; no supporting habitat
Chondestes grammacus lark sparrow	SC	--	Not present; no supporting habitat
Contopus cooperi olive-sided flycatcher	SC	--	Not present; no supporting habitat
Dendroica occidentalis hermit warbler	SC	--	Not present; no supporting habitat
Diomedea albatrus short-tailed albatross	PE	--	Not present; no supporting habitat
Elanus leucurus white-tailed kite	SC	SC	Potential to occur; feeding habitat in Emeryville Crescent outside project area, marginal nesting habitat present on YBI
Empidonax difficilis Pacific slope flycatcher	SC	--	Not present; no supporting habitat

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 6 of 15)

***Species* and Common Name**	**Status**		**Potential for Occurrence[c]**
	Federal[a]	**State[b]**	
Empidonax trailii brewster little willow flycatcher	SC	--	Not present; no supporting habitat
Falco peregrinus anatum American peregrine falcon	D, MBTA	E	Present; nests between upper and lower bridge deck on Column E2
Gavia immer common loon	SC	SC	Potential to occur for foraging; nesting habitat not within the project area
Geothlypis trichas sinuosa saltmarsh common yellow throat	SC	SC	Potential to occur; nesting habitat within the Emeryville Crescent, outside the project area
Haliaeetus leucocephalus bald eagle	T	E	Not present; no supporting habitat
Lanius ludovicianus loggerhead shrike	SC	SC	Not present; no supporting habitat
Larus occidentalis western gull	MBTA	--	Present; nesting occurs on the column footings of the existing bridge
Laterallus jamaicensis black rail	SC	T	Unlikely to occur; supporting habitat present in Emeryville Crescent, adjacent to project area on Oakland side. Species not detected in project area during surveys

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 7 of 15)

Species and Common Name	Status		Potential for Occurrence[c]
	Federal[a]	State[b]	
Melanerpes lewis Lewis' woodpecker	SC	--	Not present; no supporting habitat
Melospiza melodia pusillula Alameda song sparrow	SC	--	Potential to occur; nesting habitat within the Emeryville Crescent, outside the project area
Numenius americanus long-billed curlew	SC	SC	Potential to occur
Nycticorax nycticorax black-crowned night heron	MBTA	--	Potential to occur; nesting habitat on YBI
Oceanodroma homochroa ashy storm-petrel	SC	SC	Not present; no supporting habitat
Pelecanus occidentalis californicus California brown pelican	E	E	Present (Seasonally) at Coast Guard Station and on bents
Phalacrocorax auritus double-crested cormorant	MBTA	SC	Present; nests on bridge below lower deck
Plegadis chihi white-faced ibis	SC	SC	Not present; no supporting habitat
Rallus longirostris obsoletus California clapper rail	E	E	Potential to occur; nesting habitat within the Emeryville Crescent, outside the project area
Riparia riparia bank swallow	MBTA	T	Potential to occur; nesting habitat present on YBI

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 8 of 15)

Species and Common Name	Status		Potential for Occurrence[c]
	Federal[a]	State[b]	
Selasphorus rufus rufous hummingbird	SC	--	Unlikely to occur; foraging and nesting requirements not present
Selasphorus sasin Allen's hummingbird	SC	--	Potential to occur; nesting habitat present on YBI
Sphyrapicus ruber red-breasted sapsucker	SC	--	Not present; no supporting habitat
Sterna antillarum browni California least tern	E	E	Potential to occur; observed feeding in waters outside of the project area
Sterna elegans elegant tern	SC	SC	Potential to occur
Synthliboramphus hypoleucus Xantus' murrelet	SC	SC	Not present; no supporting habitat
Thryomanes bewickii Bewick's wren	SC	--	Potential to occur
Toxostoma redivivum California thrasher	SC	--	Not present; no supporting habitat
REPTILES			
Anniella pulchra pulchra silvery legless lizard	SC	SC	Unlikely to occur; marginal habitat; no known occurrences in project area;
Caretta caretta loggerhead turtle	T	--	Unlikely to occur; no known occurrences in project area

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 9 of 15)

***Species* and Common Name**	**Status**		**Potential for Occurrence[c]**
	Federal[a]	**State[b]**	
Chelonia mydas green sea turtle	T	--	Unlikely to occur; no known occurrences in project area
Clemmys marmorata marmorata northwestern pond turtle	SC	--	Not present; no supporting habitat
Clemmys marmorata pallida southwestern pond turtle	SC	--	Not present; no supporting habitat
Dermochelys coriacea leatherback turtle	E	--	Unlikely to occur; no known occurrences in project area
Lepidochelys olivacea olive ridley sea turtle	T	--	Unlikely to occur; no known occurrences in project area
Masticophis flagellum ruddocki San Joaquin coachwhip	SC	SC	Not present; no supporting habitat
Masticophis lateralis euryxanthus Alameda whipsnake	T (PE)	T	Not present; no supporting habitat
Phynosoma coronatum frontale California horned lizard	SC	SC	Not present; no supporting habitat
Thamnophis gigas giant garter snake	T	T	Not present; no supporting habitat
AMPHIBIANS			
Ambystoma californiense California tiger salamander	C	SC	Not present; no supporting habitat
Rana boylii foothill yellow-legged frog	SC	--	Not present; no supporting habitat

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 10 of 15)

Species and Common Name	Status		Potential for Occurrence[c]
	Federal[a]	State[b]	
Scaphiopus hammondii western spadefoot toad	SC	--	Not present; no supporting habitat
Rana aurora draytonii California red-legged frog	T	SC	Not present; no supporting habitat
FISH			
Acipenser medirostris green sturgeon	SC	SC	Present; supporting habitat outside of project area; likely to occur during high precipitation years
**Clupea harengeus* Pacific herring	--	--	Present; eelgrass spawning habitat in project area, piling, riprap
Eucyclogobius newberryi tidewater goby	E	SC	Unlikely to occur; spawning habitat not in project area
Hypomesus transpacificus delta smelt	T	T	Unlikely to occur; spawning habitat not in project area
Lampetra ayresi Pacific lamprey	SC	--	Not present; no supporting habitat
Lampetra ayresi river lamprey	SC	SC	Unlikely to occur; supporting habitat not in project area

* The Pacific herring is a commercial fish and is considered in this document because its population in the San Francisco Bay is monitored and a concern of the California Department of Fish and Game.

Abridged Notes:
Federal: **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 11 of 15)

Species and Common Name	Status		Potential for Occurrence[c]
	Federal[a]	State[b]	
Oncorhynchus kisutch Central California coast coho salmon ESU	T (PE)	E	Unlikely to occur; out of range
Oncorhynchus kisutch Southern Oregon/ Northern California coho salmon ESU	T	SC	Unlikely to occur; out of range
Oncorhynchus mykiss Central California coast steelhead ESU	T	SC	Present; shallow water foraging habitat in project area
Oncorhynchus mykiss Central-valley steelhead ESU	T	SC	Present; shallow water foraging habitat in project area
Oncorhynchus tshawytscha Sacramento Valley winter-run chinook salmon ESU	E	E	Present; supporting habitat in project area
Oncorhynchus tshawytscha Sacramento Valley winter-run chinook salmon ESU critical habitat	E	--	Present; the existing East Span of the SFOBB is considered the southern boundary of the critical habitat for the winter-run chinook
Oncorhynchus tshawytscha Central Valley fall-run and late fall-run chinook salmon ESU	PT	--	Present; supporting habitat in project area

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 12 of 15)

***Species* and Common Name**	**Status**		**Potential for Occurrence[c]**
	Federal[a]	**State[b]**	
Oncorhynchus tshawytscha Central Valley fall-run and late fall-run chinook salmon ESU critical habitat	PT	--	The existing East Span of the SFOBB could be designated as southern boundary of critical habitat for fall-run chinook salmon
Oncorhynchus tshawytscha Central Valley spring-run chinook salmon ESU	PE	SC	Present; supporting habitat located within project area
Oncorhynchus tshawytscha Central Valley spring-run chinook salmon ESU critical habitat	T	T	The existing East Span of the SFOBB could be designated as southern boundary of critical habitat for spring-run chinook salmon
Pogonichthys macrolepidotus Sacramento splittail	T	SC	Unlikely to occur; supporting habitat not in project area
Sprinchus thaleichtys longfin smelt	SC	SC	Present; likely to occur only during high water levels
INVERTEBRATES			
Adela oplerella Opler's longhorn moth	SC	--	Not present; no supporting habitat
Brachinecta longiantenna longhorn fairy shrimp	E	--	Not present; no supporting habitat
Brachinecta lynchi vernal pool fairy shrimp	T	--	Not present; no supporting habitat
Cicindela hirticollis gravida sandy beach tiger beetle	SC	--	Not present; no supporting habitat

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 13 of 15)

***Species* and Common Name**	**Status**		**Potential for Occurrence[c]**
	Federal[a]	**State[b]**	
Coelus globosus globose dune beetle	SC	--	Not present; no supporting habitat
Euphydryas editha bayensis bay checkerspot butterfly	T	--	Not present; no supporting habitat
Haliotes cracherodii Black abalone	C	--	Not present; no supporting habitat
Haliotes sorenseni white abalone	PE	--	Not present; no supporting habitat
Helminthoglypta nickliniana bridgesi Bridges' Coast Range shoulderband snail	SC	--	Unlikely to occur; no known occurrences in project area
Hydrochara rickseckeri Ricksecker's water scavenger beetle	SC	--	Not present; no supporting habitat
Hygrotus curvipes curved-foot hygrotus diving beetle	SC	--	Unlikely to occur; no known occurrences in project area
Icaricia icarioides missionensis mission blue butterfly	E	--	Unlikely to occur; marginally supporting habitat in project area. Species not observed during surveys
Incisalia mossii bayensis San Bruno elfin butterfly	E	--	Not present; no supporting habitat

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 14 of 15)

Species and Common Name	Status		Potential for Occurrence[c]
	Federal[a]	State[b]	
Lepidurus packardi vernal pool tadpole shrimp	E	--	Not present; no supporting habitat
Lichnanthe ursina bumblebee scarab beetle	SC	--	Not present; no supporting habitat
Linderiella occidentalis California linderiella fairy shrimp	SC	--	Not present; no supporting habitat
Nothochrysa californica San Francisco lacewig	SC	--	Not present; no supporting habitat
Speyeria callippe callippe Callippe silverspot butterfly	E	--	Not present; no supporting habitat

Source: Caltrans, April 2001.

Abridged Notes:
Federal: : **E** – Endangered; **T** – Threatened; **PE** - Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **C** – Candidate; **D** – Delisted; **MMPA** - Marine Mammal Protection Act; **MBTA** – Migratory Bird Treaty Act; **--** – Not listed.
State: **E** – Endangered; **T** – Threatened; **PE** – Proposed Endangered; **PT** – Proposed Threatened; **SC** – Species of Concern; **--** – Not listed.

Table 3.9-3 Continued (Page 15 of 15)

Abbreviations:

[a] Federal

E - Listed as endangered under the Federal Endangered SpeciesAct.
T - Listed as threatened under the Federal Endangered Species Act.
PE - Proposed as endangered under the Federal Endangered Species Act.
PT - Proposed as threatened under the Federal Endangered Species Act.
SC - Federal species of concern; USFWS lacks sufficient information to support a listing proposal.
C - Candidate species for which the USFWS has on file enough information to propose listing as endangered or threatened.
D - Delisted. Status to be monitored for 5 years.
MMPA - These species are protected under the Marine Mammal Protection Act.
MBTA - These species are protected under the Migratory Bird Treaty Act.
-- - Not listed.

[b] State

E - Listed as endangered under the California Endangered Species Act.
T - Listed as threatened under the California Endangered Species Act.
PE - Proposed as endangered under the California Endangered Species Act.
PT - Proposed as threatened under the California Endangered Species Act.
SC - California Department of Fish and Game Species of Concern.
-- - Not listed.

[c] Potential for Occurrence

Unlikely to occur - suitable habitat for this species was identified in the project area. However, the species is unlikely to occur due to its general avoidance of disturbed areas, lack of historic or recent occurrences near the project area, or the presence of only marginally suitable habitat.
Present - individuals of this species were found during surveys or are known to be found in the project area from literature reviews.
Not present; no supporting habitat - habitat that would support the presence of this species is not present in the project area.

3.10 HISTORIC AND CULTURAL RESOURCES

3.10.1 Regulatory Context

A cultural resources investigation was conducted in accordance with Section 106 of the National Historic Preservation Act and implementing regulations (36 CFR 800) to document the findings summarized below. On February 18, 1998, Caltrans, in conjunction with the FHWA, established an Area of Potential Effect (APE) wide enough to include all project alternatives, design options, and potential construction easements. The area was surveyed to identify cultural resources including archaeological and historic sites or properties. Accordingly, an Archaeological Survey Report (ASR), Historic Architecture Survey Report (HASR), Historic Property Survey Report (HPSR), Finding of Effect for Archaeological Resources, and Finding of Adverse Effect: Buildings and Structures were prepared for review by the State Historic Preservation Officer (SHPO). Additional reports completed after publication of the DEIS include the Addendum Archaeological Survey Report — Maritime Archaeology, the Addendum Finding of Adverse Effect, and Consideration of Proposed Mitigation Measures for Project Effects on Historic Buildings and Structures.

Cultural resources investigations for the East Span Project build on previous research conducted in 1997 by the Navy for the Naval Station Treasure Island Disposal and Reuse Project and prior Caltrans investigations for seismic retrofit work on the existing SFOBB published in 1997. These investigations and research for the East Span Project have identified cultural resources that are either listed or determined eligible for listing on the National Register of Historic Places (NRHP). The SHPO has concurred with the findings of these previous investigations and with the eligibility evaluations prepared for the East Span Project.

On June 17, 1999, revised Section 106 regulations became effective. The revised regulations, issued by the Advisory Council on Historic Preservation, replace the 1986 procedures. The new regulations significantly modify the Section 106 review process, introducing new streamlining while incorporating statutory changes mandated by the 1992 amendments to the National Historic Preservation Act (NHPA). The historic resource evaluation work conducted for the East Span Project prior to June 1999 followed the previous Section 106 regulations. All work done after June 1999 followed the current Section 106 regulations.

The evaluation of NRHP eligibility is made by applying the Criteria of Evaluation codified in 36 CFR 60.4 as follows:

- The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that:

    a. Are associated with events that have made a significant contribution to the broad patterns of our history; or

b. Are associated with the lives of persons significant in our past; or

c. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant distinguishable entity whose components may lack individual distinction; or

d. Have yielded or may be likely to yield information important in history or prehistory.

Properties are eligible or listed at the local, state, or national level of significance.

The results of archaeological and historic architectural investigations pursuant to the National Preservation Act are presented in the following sections.

3.10.2 Archaeological Resources

One archaeological site, CA-SFr-04/H, which has both a prehistoric and historic component, has been recorded within the APE. The prehistoric component of this site is a contributing element to the eligibility of the site under Criterion D. Native American burials were reported to have been removed from this site by the University of California in 1934. Since CA-SFr-04/H has contained and may again yield human remains, its significance may extend beyond Criterion D.

The historic component of CA-SFr-04/H related to the Naval Training Station was determined to be a non-contributing element for eligibility to the National Register. Archival research does indicate, however, that there is a potential for eligible historical archaeological resources within the APE which are related to the American Period and associated with the presence of the Army Post and Depot and civilian occupation. The SHPO concurred with these findings on August 13 and 21, 1998 (see its letters in Appendix G). These potential archaeological features and their contents are valuable for what can be learned through data recovery and have no value for preservation in place. See Appendix G for SHPO views on eligibility.

The Treatment Plan, discussed in Chapter 4, will identify research questions in the archaeological research design that could be addressed by data that the historic property is likely to contain. Features will be evaluated first for integrity. The level of integrity necessary to qualify examples of various property types for the NRHP under Criterion D is measured by their ability to contain the types of data necessary to contribute to the research issues identified in the research design.

Archaeological features with documented associations and a range and quantity of artifacts are among the most important potential sources of data that can be used to address the research questions. Each feature will be evaluated using the following principles:

1) Association: Does the deposit have reliable and precise historical associations?

2) Integrity: Has the site been disturbed and to what degree?

3) Materials: Are there sufficient number and variety of types of artifacts?

4) Stratigraphy: Is there discrete vertical and horizontal stratification? and

5) Relative Rarity: Remains from a social, ethnic, or economic group that is poorly represented in the sample universe will be more important because of its rarity than remains that relate to a well-represented group.

A field test of CA-SFr-04/H was conducted in March 1998. The purpose of the field test was to examine the integrity of the prehistoric component and establish vertical and horizontal boundaries of the site. The site is represented by a well-defined prehistoric midden deposit capped by a fill layer of variable thickness that is, in turn, capped by an asphalt surface. Despite previous impacts to the midden deposit during construction of the Naval Training Station and the Bay Bridge, computer modeling suggests that 1,560 cubic meters (5,520 cubic feet) of midden with high integrity remains beneath the existing asphalt surface.

Yerba Buena Island (YBI) was occupied at times by members of the *Huchiun* tribelet of the Ohlone (Costanoan) group. Prior to a field test of CA-SFr-04/H in March 1998, the Native American Heritage Commission provided a list of interested Native Americans to contact. All parties on the list were contacted to seek information or concerns they might have about this site and to identify any issues they would like to see addressed in the Treatment Plan. A Native American monitor was on site during the archaeological field test investigations. Coordination will continue with interested Native Americans.

No historic or prehistoric archaeological resources were identified within the Oakland Touchdown area of the APE, and this area is considered to possess no archaeological sensitivity. Refer to Appendix G for the views of the SHPO on archaeological resources (letters dated August 13 and 21, 1998).

Archival research revealed the possibility of submerged cultural resources within the proposed project area in San Francisco Bay, including the possibility of four sunken ships. An APE was defined within the Bay with a total area of 380 hectares (940 acres) The APE includes the existing alignment, proposed alignments of the new East Span, Clipper Cove, an area east of Building 262, and a corridor 366 meters (1,200 feet) to either side of the existing bridge, which may be disturbed by dredging activities and anchor drag during construction activities.

A Phase 1 Maritime Archaeological Survey Report was completed in February 2000 to determine if any of these submerged resources are within the APE. A sonar survey of the APE did not reveal the presence of any remains of shipwrecks. However, the sonar survey did disclose the remains of the Key System Ferry Terminal. The remains of the ferry terminal were determined not to be a contributing element to the Key System railway or the Key Pier Substation. SHPO concurred with these findings on June 6, 2000. See Appendix G for SHPO views on eligibility of maritime resources.

3.10.3 Historic Architectural Resources

Archival research and field investigations were conducted for the East Span Project and documented in a Historic Architecture Survey Report. Based on these investigations, NRHP-listed and NRHP-eligible resources have been identified within the APE as defined for the build alternatives. Listed and eligible resources are described below and identified on Figures 3-21 and 3-22 in Appendix A.

San Francisco-Oakland Bay Bridge (SFOBB)

The SFOBB, completed in 1937, is a double-deck structure carrying five lanes of traffic on each level (see Section 1.3.1 — The San Francisco-Oakland Bay Bridge and Figure 1-1 in Appendix A for a (description of the SFOBB). The SFOBB was determined eligible for listing on the NRHP in 1983. An evaluation was prepared by Caltrans as part of the Historic Property Survey Report (HPSR) for the I-280 Transfer Concept Program. The evaluation concluded that the SFOBB is eligible for listing on the NRHP under Criteria A, B, and C at the national level of significance. The SHPO reviewed this documentation and concurred with the determination that the SFOBB is eligible for inclusion on the NRHP.

On August 6, 1999, the State Historical Resources Commission approved the nomination of the SFOBB for listing on the NRHP, and the nomination was forwarded to the SHPO. In December of 1999, the SHPO forwarded the nomination to the Keeper of the NRHP. The Keeper has subsequently requested additional descriptive information; the listing of the SFOBB on the NRHP is still pending. It is also a protected Section 4(f) resource, as determined by FHWA (see Section 6.3.1 — Section 4(f) Evaluation, The San Francisco-Oakland Bay Bridge).

The property includes entrance and exit ramps connected to the western approach and the elevated bus ramps that connect the western approach to the Transbay Transit Terminal at Mission Street between First and Fremont Streets. Twin-towered suspension spans extend from San Francisco to YBI and are connected by a massive center anchorage. On YBI, there are concrete viaducts at either end of a double-deck tunnel. Continuing eastward from the island, a series of steel truss spans carries the highway across the eastern portion of the Bay.

The lower deck of the bridge originally carried two tracks for electric streetcars in addition to three lanes for trucks, while the upper deck carried five lanes for automobiles. Rail service was terminated in 1958, and the bridge was altered to its present configuration of five traffic lanes on each level. Substantial alterations were also made to the YBI tunnel and its approaches at that time. The other major alteration of the structure occurred on the western approach ramps in San Francisco, with the construction of the freeway system in the late 1950s. This work altered much of the upper deck approach ramp between First and Fifth Streets. Maintenance work over the years and repairs made after earthquakes have resulted in other changes to the structure, but the bridge as a whole retains sufficient integrity to be listed on the NRHP.

At the time the SFOBB was first opened in 1936, it held many world records. It was the greatest bridge in the world for its cost, length, quantities of steel and concrete, weight,

depth, and number of piers, the size of the bore of the tunnel on YBI, and the versatility of its engineering. Seven of its piers were deeper than any others in the world. New technologies were developed to construct the foundations. The submarine work was the greatest underwater engineering task ever undertaken. The steel for the superstructure was said to constitute the largest steel order ever placed.

Four buildings associated with the SFOBB and included in the nomination as contributors to the entire bridge are located within the project APE. These four buildings are: the Caltrans garage on YBI, the Caltrans electrical substations on YBI and at the Oakland Touchdown, and the Key Pier Substation at the Oakland Touchdown. The Caltrans garage was constructed in the late 1930s as an integral component to the SFOBB. The building is constructed of reinforced concrete (see Figure 3-23 in Appendix A). The Caltrans electrical substations are reinforced concrete structures that were constructed in the 1930s as an integral component to the SFOBB (see Figures 3-23 and 3-24 in Appendix A). The Key Pier Substation is a reinforced concrete structure that was constructed in 1926 (see Figure 3-24 in Appendix A). It was not built as a component of the SFOBB; however, it was incorporated into the bridge operation to supply power for the trains crossing the bridge. It is a contributing component of the SFOBB. It is also individually eligible for the National Register at the local level of significance under Criterion A as a rare surviving component of the historically significant Key System railway, which was an important East Bay transit system in the early 20th century.

Senior Officers' Quarters Historic District (includes Quarters 1 to 7 and Buildings 83, 205, and 230)

The Senior Officers' Quarters Historic District (the district) was identified as a property eligible for the National Register of Historic Places in a historic architecture survey of Yerba Buena and Treasure Islands carried out by the Navy in 1997. The district is eligible for the National Register at the local level of significance under Criteria A and C, in the areas of military history and architecture. These criteria may be applied to historic districts as well as individual historic properties; in general terms, a historic district contains a number of historic buildings, structures, or sites that are united historically, culturally, or architecturally, and that, as an assemblage, meet the National Register criteria of significance.

The district is comprised of Quarters 1 through 7 and three associated garages (Buildings 83, 205, and 230) (see Figure 3-21 in Appendix A). The seven residences are all of wood frame construction, with two full floors and dormered attic stories (see Figure 3-25 in Appendix A). They were constructed between 1900 and 1903 in the Classical Revival style. Quarters 1, the largest and most elaborate of these, was listed on the National Register of Historic Places in 1991. It is individually listed in NRHP at the state level of significance under Criteria A and C (see Figure 3-25 in Appendix A). Buildings 83 and 230, constructed in 1918 and 1944, respectively, both have second floor living quarters. Building 205 is a single-story garage constructed in 1936. The district is significant for its association with the Naval Training Station on YBI and as a distinctive ensemble of Classical Revival residences.

The District Record prepared by the Navy for the historic district states that "the boundaries were determined to include the historic buildings of the area, and the landscape elements that tie them together." The boundaries of this roughly triangular historic district are the road to the west of Quarters 5 and 6, the lower edge of the lawn area to the east, and a line up the hill behind Quarters 1 that encompasses the formal gardens between Quarters 1 and Building 230.

Quarters 8

USCG Quarters 8 (previously owned by the Navy) is a three-story residence of Mediterranean design, built of wood with a stucco exterior on the first two floors (see Figure 3-26 in Appendix A). It was constructed in 1905 as the home of the commander of the Marine Corps detachment assigned to YBI. The property is eligible for the NRHP at the local level of significance under Criteria A and C, in the areas of military history and architecture. The house is historically significant as one of the few extant buildings from the early 20th century associated with the Naval Station on YBI and the last remaining building associated with the Marine Corps' presence on the island. It is also architecturally significant as the work of prominent San Francisco architects James and Merritt Reid.

Quarters 9

USCG Quarters 9 (previously owned by the Navy) is a 1-1/2-story residence of wood-frame construction (see Figure 3-27 in Appendix A). The property is eligible for the NRHP at the local level of significance under Criteria A and C, in the areas of military history and architecture. It was built ca. 1916 as the residence for the civilian "master of tugs" and is the only extant building on YBI constructed for a civilian employee of the Navy. It is also one of the few surviving buildings on the island from the period of extensive growth of the Naval Station in the years before and during U.S. involvement in World War I.

Quarters 10

Naval Quarters 10 is a two-story, wood-frame residence constructed in 1948 (see Figure 3-28 in Appendix A). The property is eligible under NRHP Criterion C at the local level of significance for its architecture (Bay Area modernism). The historic property includes the garage, Building 267, which was constructed at the same time as the house and is included as a contributing component of the historic resource.

Building 262

Building 262 (often referred to as "the torpedo building"), at the eastern end of YBI, is a reinforced concrete building with a gable roof clad in corrugated metal (see Figure 3-29 in Appendix A). The property is eligible for the NRHP at the state level of significance under Criteria A and C, in the areas of military history and architecture. It was constructed for the U.S. Army in 1891, to manufacture and store mines used in coastal defenses. The building is historically significant as the only extant building associated with the 19th century Army presence on YBI. It is also significant architecturally as a pioneering example of reinforced concrete construction, a building technique that was still in its infancy in 1891.

Other Properties

No other historic properties exist within the APE. There are no California Historical Landmarks, California Points of Historical Interest, or city-designated landmarks within the APE. NRHP historic districts exist in proximity to the East Span Project APE but would not be affected by the proposed action and, thus, were not included in the APE. The USCG historic district is located to the southwest and outside the APE on YBI and would not be affected by the project. The Oakland Army Base historic district is located to the east of the APE at the Oakland Touchdown area and would not be affected by the project. Located on TI, outside of the APE, are Buildings 1, 2, and 3. All three buildings, which are eligible for listing on the NRHP, were constructed in 1939 and used in the Golden Gate International Exposition.

Concurrence

Consultation was initiated with the SHPO in June 1998, concerning eligibility of resources within the APE for the East Span Project. The SHPO responded in a letter dated August 13, 1998 (see Appendix G: Agency Consultation Letters), and concurred with National Register eligibility for Quarters 10, Navy Building 267 (the garage for Quarters 10), the Bay Bridge Oakland Substation, and the Key Pier Substation. The SHPO had concerns about the pre-1948 buildings that were considered ineligible and requested information evidencing that FHWA solicited the comments of the Navy and USCG on the eligibility of these properties. Caltrans addressed this concern, and the SHPO responded in a letter dated August 21, 1998, concurring that the buildings are not eligible (a copy of the August 21 letter can be found in Appendix G). In addition, in a letter from the SHPO regarding the proposed retrofit of the SFOBB dated August 13, 1997 (see Appendix G), the SHPO concurred that the YBI Electrical Substation and the Caltrans garage on YBI are eligible for the NRHP because they are contributors to the SFOBB as a whole.

In summary, there are nine historic properties in the APE that were assessed for effects:

1) Archaeological site CA-SFr-04/H (eligible);
2) SFOBB and contributing components (eligible; in process of being listed);
3) Key Pier Substation (contributing to SFOBB; also individually eligible);
4) Senior Officers' Quarters Historic District (eligible);
5) Quarters 1 (listed);
6) Quarters 8 (eligible);
7) Quarters 9 (eligible);
8) Quarters 10 (eligible); and
9) Building 262 (eligible).

3.11 SCIENTIFIC RESOURCES

Paleontologic resources, typically vertebrate or invertebrate fossilized remains, are afforded federal protection under 40 CFR 1508.27 as a subset of scientific resources. California Public Resources Code Section 5097.5 provides for protection of paleontological sites and features on public lands. Paleontologic resources may exist within the project APE in sediments underlying San Francisco Bay. A mammoth tooth was discovered in the 1930s within Bay sediments during construction of the existing SFOBB East Span at Pier E11. California Public Resources Code Section 5097.5 mandates that "No person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any...vertebrate paleontological site, including fossilized footprints...or any other paleontological...feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands." Typically, the State Lands Commission is the designated public agency with jurisdiction. To comply with the California Public Resources Code, Caltrans would use its policy in the "Interim Guidance for the Identification, Assessment, and Treatment of Paleontological Resources," July 1991. The guidance was developed based on the "1982 Bureau of Land Management Grand Junction District, Colorado: Draft Paleontological Instruction Memo."

3.12 DISPOSAL OF DREDGED MATERIALS

3.12.1 Regulatory Context

Dredging and dredged material reuse/disposal is regulated by a number of agencies. The regulatory framework that governs dredged materials reuse/disposal include:

Federal Clean Water Act (FCWA). Section 404 of the FCWA authorizes the Army Corps of Engineers (ACOE) to issue permits regulating the discharge of dredged or fill material into the Waters of the U.S., including wetlands. Caltrans will obtain a Section 404 permit from the ACOE prior to project construction.

Rivers and Harbors Act. Section 9 of the Rivers and Harbors Act of 1899 is another federal regulation that applies to the East Span Project. Section 9 prohibits the construction of any bridge, dam, dike, or causeway over or in Navigable Waterways of the U.S. without Congressional approval. Administration of Section 9 has been delegated to the U.S. Coast Guard (USCG). Caltrans will obtain a Section 9 permit (Bridge Permit) from the USCG prior to the project construction.

In a letter to the ACOE dated August 26, 1999 (see Appendix G), the USCG stated that it would use its Section 9 permit to authorize dredging related to the construction of new piers and footings and removal of existing piers. Dredging for the barge access channels would be authorized by the ACOE under Section 10 of the Rivers and Harbors Act. This section regulates dredging or disposal of dredged material, excavation, filling, or other modification of a navigable water of the United States.

Marine Protection, Research, and Sanctuaries Act. The Marine Protection, Research, and Sanctuaries Act (MPRSA) regulates the ocean dumping of waste, provides for a research program on ocean dumping, and provides for the designation and regulation of marine sanctuaries. Section 102 of MPRSA authorizes EPA to issue ocean dumping permits for the transport and disposal of materials into the oceans. To protect critical ocean areas, EPA may designate the sites and time periods during which ocean disposal can occur.

Coastal Zone Management. There are three coastal zone management agencies in California: the California Coastal Commission, the San Francisco Bay Conservation and Development Commission (BCDC), and the Coastal Conservancy. BCDC has jurisdiction over San Francisco Bay. Under the Coastal Zone Management Act, BCDC issues federal consistency determinations for projects within its jurisdiction. Together, the McAteer-Petris Act, the San Francisco Bay Plan, the Seaport Plan, Special Area Plans, and BCDC's regulations comprise BCDC's Federally approved Coastal Zone Management Program. The East Span Project is within BCDC's jurisdiction. Project compliance with BCDC's federally approved Coastal Zone Management Program is addressed through BCDC's permitting process. Caltrans will obtain a permit and a federal consistency determination from BCDC prior to project construction.

The McAteer-Petris Act created BCDC in response to haphazard and uncoordinated filling of the San Francisco Bay. The primary purpose of the act is to promote responsible planning and development of San Francisco Bay. The act emphasizes the

elimination of unnecessary fill in the Bay, the use of the Bay for water-oriented purposes, and the provision of maximum feasible public access consistent with a proposed project. The act requires that a project have permits to fill, to extract materials, and to make substantial changes in use of land, water, or existing structures in the Bay. BCDC prepared the San Francisco Bay Plan (1969) which established policies to guide development in and along the Bay through a permitting process (see Section 3.1.3 — Adopted Goals and Policies).

Long-Term Management Strategy (LTMS) and Dredged Material Management Office (DMMO). In 1990, a consensus-based approach, the "Long-Term Management Strategy" (LTMS), was initiated by a group of federal, state, and local agencies to address and resolve the issue of dredging and dredged material disposal in the Bay Area. The signatories to the LTMS are the California State Lands Commission, San Francisco Bay Conservation and Development Commission, San Francisco Bay Regional Water Quality Control Board, U.S. Army Corps of Engineers, and U.S. Environmental Protection Agency.

In 1995, the LTMS program signatories established the Dredged Material Management Office (DMMO). The multi-agency DMMO seeks to foster a comprehensive and consolidated approach to handling dredged material management issues. While not a signatory, the California Department of Fish and Game also provides advice and expertise to the DMMO.

The DMMO program is reviewed every six months and is charged with fostering a comprehensive and consolidated approach to the processing of dredging reuse/disposal permit applications.

An LTMS Policy Environmental Impact Statement/Programmatic Environmental Impact Report (1998) developed policy recommendations and strategies for the placement of dredged material in the Bay region. The LTMS has three objectives:

- To distribute the dredged material between upland/wetland reuse sites, the ocean, and in-Bay in a manner that minimizes environmental impacts and maximizes environmental benefits in an economically sound manner;
- To identify guidelines for use during project planning to avoid or reduce potential harm while conducting necessary dredging and disposal activities; and
- To develop policies to improve regulatory certainty across all disposal options.

Each of those objectives translates, respectively, into the following LTMS proposed actions:

- Dredged material placement distributions;
- Comprehensive analysis of environmental impacts and risks (including cumulative impacts) and mitigation of potential adverse environmental effects; and

- A management system that successfully improves regulatory certainty.

The DMMO also reviews sediment sampling plans and results of sediment testing to assess the suitability of placing the sediment at various reuse/disposal sites.

One of the DMMO's goals is to evaluate whether dredged materials are suitable for unconfined aquatic disposal (SUAD) or not suitable for unconfined aquatic disposal (NUAD).

Although the DMMO issues a recommendation regarding dredged material reuse/disposal based on sediment testing results, the individual agencies that comprise the DMMO must still issue specific regulatory approvals for projects.

3.12.2 Sediment Sampling and Analysis

Caltrans has conducted sampling and analysis of sediments that would be dredged at the locations of new columns for the Preferred Alternative (Replacement Alternative N-6) and at barge and construction access areas for the northern replacement alternatives for the East Span Project. A DMMO-approved Sampling and Analysis Plan (SAP) to characterize sediments was developed through the DMMO review and comment process. Caltrans understands that additional sediment characterization may be required by DMMO if an alternative other than Replacement Alternative N-6 is selected. Caltrans also understands that, for all replacement alternatives, the sediments in the barge access channel for dismantling the existing bridge would need to be characterized in the future.

Results of Sediment Testing

The sediment testing evaluated the physical, chemical, and biological make-up of potential dredged material. The sediments encountered during the investigation were primarily silt and clay. Chemical analyses indicated that although some metals were detected in site sediments at levels exceeding San Francisco Estuary ambient concentrations, the majority of organic and inorganic analyte concentrations in site sediments were similar to concentrations detected in baseline sediments. Elevated levels of total polynuclear aromatic hydrocarbons (PAHs) (5,840 micrograms per liter [µg/L]) were detected at some column locations near Yerba Buena Island (YBI).

Liquid/suspended phase bioassays using sea urchins (*Strongylocentrotus purpuratus/Lytechinus pictus),* shrimp *(Mysidopsis bahia),* and fish *(Citharichthys stigmaeus)* were performed to evaluate the effect of site sediments on water column organisms in comparison with applicable baseline sediments. The results do not preclude any site sediments from disposal in the Bay or ocean or reuse at upland wetland reuse sites.

Solid phase bioassays using amphipods (*Ampelisca abdita*) and worms (*Nephtys caecoides*) were performed to evaluate the effect of site sediments on benthic organisms in comparison with applicable baseline sediments. The results of solid phase bioassays indicate that sediments from several locations near the Oakland

Touchdown are not suitable for disposal in the Bay or ocean and reuse at upland wetland reuse sites. These sediments would be properly disposed of at various commercial landfills.

Bioaccumulation testing was performed using clams (*Macoma nasuta)* and worms (*Nephtys caecoides)* to evaluate site sediment with deep ocean baseline sediment. PAH bioaccumulation was observed in sediments from near YBI and near the Oakland Touchdown, precluding sediments from these areas from disposal at the deep ocean site. Bioaccumulation observed at all other sites was not considered sufficient to restrict disposal of these site sediments at disposal sites in the Bay, ocean, or beneficial reuse at upland wetland sites.

In its letter of October 31, 2000 (see Appendix G for a copy of the letter), the DMMO made the following conclusions regarding the disposal of dredged materials:

1) Up to 248,219 cubic meters (324,681 cubic yards) of site sediments are suitable for unconfined aquatic disposal (in-Bay and deep ocean) and;

2) Up to 319,181 cubic meters (417,503 cubic yards) of site sediments are suitable for beneficial reuse at upland wetland sites.

As discussed above, any sediment not suitable for the above sites would be properly disposed of at a landfill.

See Section 4.14.10 — Construction Excavation and Dredging for a discussion of project dredging quantities.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

4.1 COMMUNITY IMPACTS

The East Span Seismic Safety Project (East Span Project) does not lie within the boundaries of any established residential neighborhood. Land within the project area is under institutional, residential, and commercial use. Project alternatives were analyzed for potential impacts to local communities, including impacts on employment; community services; potential for displacement of residences, businesses, or public facilities; and consistency with existing land uses and development policies.

4.1.1 Social and Economic Impacts

Project alternatives were analyzed for potential social and economic impacts. Socioeconomic impacts are considered to occur if a project:

- Induces substantial growth in a community or prohibits desirable growth;
- Places demands on community facilities;
- Disrupts existing patterns of interaction in a neighborhood; and
- Affects a low-income or minority community.

The East Span Project is not expected to have adverse social or economic impacts on established neighborhoods or communities because of the project's location in an institutional and industrial setting with limited residential use and because the alternatives do not change existing transportation capacity. Any project-related changes to social or economic conditions in Bay Area neighborhoods or communities are expected to result from the employment impacts of the large construction labor force that would be needed to construct the build alternatives.

Employment

Project build alternatives would generate demand for workers during the construction period. Construction would have a positive impact by generating direct construction jobs and spin-off service employment opportunities within the region. Workers are expected to be recruited from the local labor force, with specialty skills being provided by workers from inside and outside the region.

The Bay Area has a large labor force and strong economy; thus, it is expected that the vast majority of the construction labor force would be workers already living in the area. However, some specific work, such as bridge iron work, can only be done by a limited number of national contractors, resulting in a need to import specialist workers. In a worst-case scenario, in which there are many major construction projects occurring concurrently (compared to the base level), a shortfall of construction workers could develop in the region.

If a shortage developed, other workers would commute from outside the region (Central Valley) or take up temporary residence. Temporary construction workers often rent rooms stay in motels, or seek other types of temporary housing during the work week, leaving their families behind. In addition to motels and rooms, there are more than 700,000 rental units within the Bay Area. Although there is a low vacancy rate in the Bay Area, the potential impact of the project labor force would not be noticeable on the housing market. The Bay Area is a large and dynamic region. At any given time, some companies and agencies are reducing their labor force while others are increasing. There is a movement of workers and households in and out of the Bay Area at all times, and the demand generated by East Span construction activities would not cause an adverse impact on the general availability of labor supply, the housing market, or school enrollment.

Construction materials, such as steel and concrete, are not produced in the project vicinity and are likely to be purchased from other areas. Thus, the local primary economic benefits of the project would be the direct construction jobs and the economic multiplier caused by local spending of the construction labor force. The Association of Bay Area Governments (ABAG) estimates that the number of local secondary jobs created is 1.44:1 construction job. Because the region has a large design and engineering labor force, this effect is likely to occur locally as well, providing additional labor jobs.

No-Build Alternative. The No-Build Alternative would not generate additional employment opportunities because no construction work beyond the prior Interim Retrofit Project would be undertaken.

Retrofit Existing Structure Alternative. Engineering design and construction of the Retrofit Existing Structure Alternative are expected to generate approximately 2,356 total person years of employment not otherwise predicted for the Bay Area economy (see Table 4.1-1). A forecast of construction workers required to retrofit the existing East Span, by trade, assumes 60 iron workers, 60 pile drivers, 100 operating engineers, 60 carpenters, 40 concrete finishers, 40 laborers and miscellaneous workers.

Table 4.1-1 Potential Project Construction Employment Impacts of Build Alternatives

Alternative	Construction Cost ($000)	Construction Person Yrs.[a]	Engineering Design Cost ($000)	Design Person Yrs. [b]	Total Person Years
Retrofit Existing	$818,000	1,636	$90,000	720	2,356
N-2[c]	$1,476,000	2,952	$160,000	1,280	4,232
N-6 (Preferred) [c]	$1,485,000	2,970	$165,000	1,320	4,290
S-4[c]	$1,475,000	2,952	$160,000	1,280	4,232

Sources: Caltrans, September 1998.
Assumptions: [a] 19% of construction cost = labor @ $95,000/person year (includes overhead).
[b] 100% of design & engineering = labor @ $125,000/person year.
[c] High range of cost estimate for this alternative is presented in Table 2.4-1.
Note: The cost information in this table represents the estimated cost of the various alternatives based on information available in 1998. They do represent the current costs of the alternatives, which would be greater, but still have the same relative relationship. See Section 2.4.2 — Costs for more information.

Replacement Alternatives

A forecast of construction workers required to construct a replacement bridge was estimated based on average annual employment of 600 people over the estimated seven-year construction period, which includes dismantling the existing bridge. (The number of employees required would increase if the construction period is shortened.) Estimated direct labor by trade is: 102 iron workers, 100 pile drivers, 168 operating engineers, 100 carpenters, 65 concrete finishers, and 65 laborers and miscellaneous workers.[1] With a peak period of two years for structural work on a new bridge, a peak demand of approximately 175 iron workers would be required.

Replacement Alternatives N-2, N-6 (Preferred), and S-4 are each calculated to generate slightly more than 4,000 total person years of employment over the construction period (see Table 4.1-1).

Impacts of Build Alternatives. Build alternatives would generate direct and indirect labor demand during a period lasting up to seven years. Workers are expected to be drawn from the regional labor pool with specialty trades generating demand from outside the Bay Area. A portion of the specialty trades may be attracted to the Bay Area for the duration of the project. Because of the large Bay Area economy, consisting of approximately three million jobs, worker-generated demands for housing or community services are not expected to have a noticeable effect on San Francisco, Oakland, or other Bay Area community housing stocks or services. The project is expected to have a beneficial impact on San Francisco and Oakland economies by generating direct and indirect jobs. The community would benefit through direct and secondary employment opportunities and no mitigation is required.

Neighborhoods

San Francisco (Yerba Buena Island). Construction of the Retrofit Existing Structure Alternative and replacement alternatives all have the potential to cause temporary impacts to residents on Yerba Buena Island (YBI), including USCG housing and occupied former Navy housing. (See Section 4.14 — Temporary Impacts during Construction Activities for more details.) There would be no permanent impacts.

Oakland. A construction staging area could be built at the former Oakland Army Base (OARB). Construction activity would not affect neighborhoods in West Oakland. Because the project would be built within San Francisco Bay, there would be no impacts to community cohesiveness or other permanent impacts to West Oakland neighborhoods.

4.1.2 Community Services

No impacts to community services were identified under any of the categories: utilities, fire protection services, and police services. Permanent utility service would not be disrupted by the project (see Section 4.12 — Utilities Relocation for more details); police and fire protection services would not change as a result of the project, and access to the Treasure Island (TI) elementary school would not be affected by the project.

[1] Richard Parrino, Parsons Brinckerhoff, March 1998.

One of the columns of Replacement Alternative S-4 would be placed on the East Bay Municipal Utility District (EBMUD) pipeline that feeds into the dechlorination facility on the Oakland Touchdown. If Replacement Alternative S-4 is carried through to final design, the column could be moved to avoid the pipeline. However, even if the column is relocated under Replacement Alternative S-4, there would be insufficient vertical clearance between the bridge structure and the road used by large chemical supply tractor-trailer trucks to serve the dechlorination facility. To maintain EBMUD's access to its facility, the road, the facility, or both would need to be relocated (see Section 4.1.4 — Impacts to Existing Land Use for further details).

4.1.3 Environmental Justice

There are no identified minority or low-income populations or communities in the project area. (FHWA defines populations as "readily identifiable groups or clusters of minority persons and/or low-income persons who are in the project study area.")[2] Outside the project area limits on TI and in West Oakland there are communities which are comprised of minority and low-income populations.

Title VI Policy Statement
Appendix L contains Caltrans policy regarding compliance with Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987, and Title 29 CFR Part 21.

No-Build Alternative
There would be no change in the existing environment in the neighborhoods outside of the project area limits.

Retrofit Existing Structure and Replacement Alternatives
Only minimal impacts are expected on the TI community. During construction of the project, temporary changes in access and bridge closures would affect mobility of the TI community. Caltrans is continuing to investigate the number and timing of partial or full bridge closures in an effort to simultaneously minimize public inconvenience, facilitate construction and maximize public safety. Short-term closures would be timed during off peak hours and Caltrans would implement a traffic management plan to manage impacts to traffic. Those who live or work on TI would be notified of any bridge closures or changes in access through signage and possibly direct mailings. Final notification procedures would be determined through the Traffic Management Plan.

Emergency access to TI/YBI would be provided at all times.

Communities in West Oakland are not expected to encounter any traffic or access problems or other adverse impacts from the project.

As indicated in Section 4.1.1 — Social and Economic Impacts, construction of any of the build alternatives could provide increased employment opportunities from which

[2] Federal Highway Administration, Western Resource Center – San Francisco, Interim Guidance Addressing Environmental Justice in the Environmental Assessment (EA)/Environmental Impact Statement (EIS), July 2, 2000.

both the TI and West Oakland neighborhoods could benefit. In addition, the benefits of the completed project including improved traffic operations and safety, would be provided to all adjacent neighborhoods.

It was determined that there are no minority or low-income populations in the project area that would be adversely affected by the East Span Project. Based on the environmental analysis in other sections of the FEIS, the Preferred Alternative or other build alternatives would not cause disproportionately high and adverse impacts (including any indirect impacts) on minority or low-income populations outside the project limits.

4.1.4 Impacts to Existing Land Use

This section describes changes in land use that would occur as a result of the project alternatives.

Changes in Land Use

Potential project-related changes to existing land uses on YBI and at the Oakland Touchdown are summarized in the following section. Permanent impacts are addressed here. Short-term construction-period impacts are addressed in Section 4.14 — Temporary Impacts During Construction Activities.

Land Use Impacts on Yerba Buena Island.

No-Build Alternative. Implementation of the No-Build Alternative would not cause a change in any existing land uses on YBI. No impacts would result and no mitigation would be required.

Retrofit Existing Structure Alternative. With the exception of temporary impacts during construction, the Retrofit Existing Structure Alternative would not cause any changes to existing land uses in the project area. The footprint of Columns YB1, YB2, YB3, YB4, and E1 would be expanded in size but would remain in their current locations. Because the towers and cross-members would be encased in concrete, current views through the towers would be blocked (refer to Figure 4-15a in Appendix A and see Section 4.3 — Visual Impact Analysis). No new columns would be constructed on the island. No permanent impacts would result from the retrofit alternative and no mitigation would be required.

Replacement Alternatives. The new bridge structure for each replacement alternative would begin east of the YBI tunnel portal. The areas of impact for each of the three alternatives overlap. Many of the same buildings on the eastern edge of the island would be affected by all of the alternatives.

Replacement Alternative N-2. Replacement Alternative N-2 is positioned to the north of the existing East Span. The alternative would place 26 bents between the YBI tunnel eastern portal and the eastern end of YBI. The alternative would also require construction of temporary detours to be used while the viaduct is retrofitted and transition structures on YBI are constructed. (Refer to Appendix A for alignment and

temporary detour drawings.) Impacts of the temporary detours are discussed in Section 4.14 — Temporary Impacts During Construction Activities.

An existing road providing access to the northeast end of the island would be blocked (see Section 4.2.1 — Vehicular Circulation and Access). The alternative would not remove existing structures or block access to existing uses on the island.

Replacement Alternative N-2 would cross approximately 53 meters (175 feet) above the ground at vacant Navy Building 262, but would not place columns at locations which would obstruct future access to the building. Navy Building 213 (fire truck storage) would be removed to allow for construction of the temporary detours (which would require placement of a column through the building.) The alternative would be approximately 10 meters (33 feet) closer horizontally to Quarters 1 than the existing East Span (i.e., approximately 40 meters [130 feet] south of Quarters 1). However, the proximity of the span would not affect access to this building or place the columns permanently within the boundaries of the Senior Officers' Quarters Historic District.

Replacement Alternative N-2 would displace Buildings 30 (storage), 40 (administration), 75 (storage), and 270 (vacant) to relocate the USCG access road and gate and Building 213 to allow for temporary detour construction. Construction of Replacement Alternative N-2 would require that the existing access road and gate to the USCG facility be moved south. Replacement Alternative N-2 has not been identified as the Preferred Alternative.

Mitigation:
If Replacement Alternative N-2 were constructed, Caltrans would work with the USCG and Navy to provide replacement buildings of like size, construction, construction materials, and quality, built to current code requirements for Buildings 30, 40, 75, 213, and 270. The USCG and Navy would need to provide suitable sites for the replacements outside state right-of-way.

Replacement Alternative N-6 (Preferred). Replacement Alternative N-6 is located to the north of the existing East Span in an alignment similar to Replacement Alternative N-2. The alternative would place approximately 19 bents between the eastern portal of the YBI tunnel and the eastern edge of YBI. The alternative would require construction of temporary detours to be used while the viaduct is retrofitted and transition structures on YBI are constructed. (Refer to Appendix A for alignment and temporary detour drawings.) Impacts of the temporary detours are discussed in Section 4.14 — Temporary Impacts During Construction Activities.

Replacement Alternative N-6 would cross approximately 53 meters (175 feet) above the ground at vacant Building 262, but would not place columns at locations which would obstruct future access to the building. Building 213 (fire truck storage) would be removed to allow for construction of the temporary detours. The alternative would be approximately 10 meters (33 feet) closer horizontally to Quarters 1 than the existing East Span, which is approximately 40 meters (130 feet) south of the building. However, the proximity of the span would not affect access to the building or place columns permanently within the boundaries of the Senior Officers' Quarters Historic District.

Replacement Alternative N-6 would displace Buildings 30, 40, 75, and 270 to relocate the USCG access road and gate and Building 213 to allow for temporary detour construction. Construction of Replacement Alternative N-6 would require that the existing access road and gate to the USCG facility be moved south.

Mitigation:
If Replacement Alternative N-6 were constructed, Caltrans would work with the USCG and Navy to provide buildings of like size, construction, construction materials, and quality, built to current code requirements for Buildings 30, 40, 75, 213, and 270. The USCG and Navy would need to provide suitable sites for the replacements outside state right-of-way.

Replacement Alternative S-4. Construction of Replacement Alternative S-4 across YBI would require 24 bents between the eastern portal of the YBI tunnel and the eastern shoreline of the island. Temporary detours would be required on YBI during construction.

Replacement Alternative S-4 would displace Buildings 30, 40, 75, and 270 to relocate the USCG access road. Replacement Alternative S-4 would be located approximately 50 meters (164 feet) from Quarters 1, which is 10 meters (33 feet) farther than the existing East Span, and 60 meters (190 feet) from Navy Building 262.

Mitigation:
If Replacement Alternative S-4 were constructed, Caltrans would work with the USCG to provide buildings of like size, construction, construction materials, and quality, built to current code requirements for Buildings 30, 40, 75, and 270. The USCG and Navy would need to provide suitable sites for the replacements outside state right-of-way.

Land Use Impacts at the Oakland Touchdown Area. Replacement Alternatives N-2 and N-6 touch down to the north of the existing East Span while Replacement Alternative S-4, the southern alternative, touches down south of the existing structure.

No-Build Alternative. Implementation of the No-Build Alternative would not cause a change in any existing land uses in the Oakland Touchdown area. No impacts would result and no mitigation would be required.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would not cause any changes to existing land uses in the Oakland Touchdown area. The bridge footprint would be modified only to increase the size of Column E23 at the western end of the touchdown area. No permanent impacts would result from the retrofit alternative and no mitigation would be required.

Replacement Alternatives.

Replacement Alternatives N-2 and N-6 (Preferred). Replacement Alternatives N-2 and N-6, located to the north of the existing span, would have a similar approach to the Oakland Touchdown area. The northern alternatives would require the permanent displacement of 0.2 hectare (0.5 acre) of land north of the existing bridge that the City of Oakland has designated as Resource Conservation Area.

Replacement Alternative S-4. As shown in Figures 2-11.4 and 2-11.5 in Appendix A, Replacement Alternative S-4 would occupy the westernmost portion of the vacant OARB land to the south of the existing East Span and open storage areas just north of the vacant OARB land used by Caltrans.

Replacement Alternative S-4 is currently designed to place a column in the pipeline east of the EBMUD dechlorination facility. While the column could be redesigned to avoid the pipeline, the vertical clearance between the structure and the service road is insufficient to allow for delivery vehicles to the dechlorination facility. Consequently, if Replacement Alternative S-4 were selected, there would be a conflict with the facility.

Several solutions were evaluated to possibly eliminate the conflict. They include:

- Relocating the existing access road far enough south to provide sufficient vertical clearance beneath the roadway. This would require placing additional fill in the Bay to build the roadway. The area of new fill would be approximately 0.36 hectare (0.9 acre) and the volume would be approximately 13,650 cubic meters (18,000 cubic yards);

- Lowering the grade of the existing service road to create a tunnel beneath Replacement Alternative S-4. The high water table at the Oakland Touchdown would make the tunnel susceptible to flooding and require a pump system to keep the service road open at all times. Caltrans would likely incur ongoing responsibilities for maintaining the tunnel roadway and facilities;

- Building an overpass structure over Replacement Alternative S-4. The overpass structure would add an additional roadway structure near the western end of the Oakland Touchdown area that would block Bay views for motorists, pedestrians, and bicyclists;

- Relocating the dechlorination facility to the north would require the relocation of at least a part of the onshore pipeline while keeping it operational at all times and preventing accidental discharge of effluent. This would still require the service road to be routed under or over Replacement Alternative S-4;

- Relocating the dechlorination facility to the south would require the relocation of part of the onshore pipeline while keeping it operational at all times and preventing accidental discharge of effluent. The relocation would also require additional fill in the Bay for support of the facility;

- Relocating the dechlorination facility to the west would require additional fill in the Bay to support it and would still require the service road to be routed under or over Replacement Alternative S-4; and

- Relocating the dechlorination facility to the east of Replacement Alternative S-4 would reduce the distance over which the effluent is treated. This would reduce the chlorine contact time. EBMUD's discharge operations would need to be modified to provide the same treatment to the effluent over a shorter distance to meet the requirements of EBMUD's permit from the Regional Water Quality Control Board limiting coliform in the effluent.

Mitigation:
If Replacement Alternative S-4 were constructed, Caltrans would work with EBMUD to relocate the service road and/or the dechlorination facility to maintain EBMUD's operations. Caltrans would obtain necessary permits/permit amendments, fund relocation costs, and implement any necessary mitigation. Caltrans would assure continual operation of EBMUD's discharge system during relocation.

4.1.5 Development Trends

The purpose of this section is to evaluate the relationship between the proposed project and anticipated development trends at YBI and the Oakland Touchdown area.

Yerba Buena Island/Treasure Island Draft Reuse Plan Consistency

The Treasure Island Draft Reuse Plan (1996 Draft Reuse Plan) includes "minimum" development scenarios, based upon the existing traffic capacity and access and a guiding policy for development of Naval Station Treasure Island, which states that development should be limited to uses for which access can be accommodated primarily by ferry.

Vehicular access is a major constraint to development on YBI/TI. The East Span Project would not increase the SFOBB's capacity nor would it improve the access points from the SFOBB to YBI/TI. The eastbound on-ramp to the SFOBB would be replaced with a ramp that provides a standard acceleration lane as opposed to the current stop-sign design, resulting in improved eastbound access to the bridge from YBI.

The 1996 Draft Reuse Plan envisions that development of YBI/TI would occur in five phases. Each phase would build on the previous phase in order to generate the revenue necessary to make needed infrastructure improvements. In turn, this infrastructure would allow for more intensive development in subsequent phases. The phased implementation process is projected to extend over a period of 35 years. Development on YBI is envisioned to occur within the first three phases of plan implementation, which are projected to occur over a 15-year period. To the extent the implementation plan was premised on release by the U.S. Navy and CCSF of a final NEPA/CEQA document several years ago, the phasing schedule appears to be approximately three years behind schedule, as the U.S. Navy and CCSF have not yet released the draft NEPA/CEQA document.

Planned development near the bridge on YBI includes a 5,600-square meter (60,000-square foot) conference center, 13 artisan cottages, and 75 live/work units. This development is in Phase 3 and is scheduled to begin in 2007. The three implementation phases affecting YBI are summarized below.

Phase 1
Phase 1 was anticipated to begin in 1997 and continue through 2001 as closure of the base occurred. In this phase, limited interim uses of the existing facilities are planned. On YBI, Phase 1 assumes that all of the existing buildings would continue in civilian uses, including provision of housing for the homeless and use of Quarters 1 through 7 as a conference/ meeting center. (Note: Housing for the homeless is now in process on TI. No housing for the homeless is planned for YBI.)

Phase 2
Phase 2 improvements are listed in the 1996 Draft Reuse Plan as scheduled to occur between 2002 and 2006. Phase 2 envisions the beginning of improvements to the TI shoreline, including causeway reinforcement between TI and YBI and creating a secure land link to the SFOBB and the proposed ferry terminal on TI. After infrastructure improvements are made, a theme park, sports complex, maritime administration, and expansion of the film studios on TI are proposed as part of Phase 2.

On YBI, Phase 2 includes redevelopment of the existing housing on the west side of the island for housing and hotel uses.

According to the 1996 Draft Reuse Plan, expansion of the Treasure Island Marina was originally scheduled for Phase 2 development. Since the plan was written, the marina project has been accelerated and is currently in the planning stage (see Figure 4-23 in Appendix A).

Construction of the Treasure Island Marina is scheduled to begin in mid to late 2001, after approval of the final plan, preparation and approval of the environmental document, and acquisition of permits.

Phase 3
Phase 3 improvements are listed in the 1996 Draft Reuse Plan as scheduled to occur between 2007 and 2011, which is after completion of the East Span Project (2006). Consequently, there would be no construction conflicts between the two projects. In Phase 3, improvements would be made to stabilize the eastern shoreline on TI, which would allow completion of the theme park. Development of a hotel/retail area is also envisioned in this phase.

On YBI, Phase 3 improvements would include development of the conference center and artisan cottages on the eastern end of the island.

The development potential of YBI would be affected but not precluded by the physical location of the project. Due to the steep topography of most of the island, the eastern end is considered by the CCSF to be the only viable location for development. Also, because the 1996 Draft Reuse Plan will be subject to a number of environmental and

regulatory reviews prior to its implementation (including a BCDC federal consistency determination and permit, discussed in Section 4.1.6 — Adopted Goals and Policies), the amount and location of new development on the eastern end of YBI may vary widely from the current development concepts. An analysis of the impacts on the development trends on YBI is described below.

No-Build Alternative. The No-Build Alternative would not conflict with the 1996 Draft Reuse Plan development scenarios, although vehicular access to and from the East Bay could be affected in the aftermath of a major earthquake.

Retrofit Existing Structure Alternative. Expansion of existing East Span columns on YBI would not conflict with redevelopment scenarios for YBI. Since the 1996 Draft Reuse Plan was developed with the bridge in its current location, the conceptual land uses proposed in the plan could be developed under the Retrofit Existing Structure Alternative.

The Retrofit Existing Structure Alternative is consistent with the 1996 Draft Reuse Plan in that it does not include modifications to YBI on- and off-ramps that would change the capacity of existing vehicular access. YBI ramps are not owned by Caltrans and are not critical to providing a lifeline connection in the project corridor. Therefore, the retrofit alternative would not conflict with the transportation access assumptions of the 1996 Draft Reuse Plan.

No long-term impacts would result from implementation of the Retrofit Existing Structure Alternative and no mitigation measures would be required. Temporary impacts during construction are addressed in Section 4.14 — Temporary Impacts During Construction Activities.

Replacement Alternatives N-2 and N-6 (Preferred). The northern alternatives would require placement of footings and columns across the eastern end of YBI. The conceptual development scenario contained in the 1996 Draft Reuse Plan (Figure 4-1 in Appendix A) could be implemented under either Replacement Alternative N-2 or N-6. The number of live/work units and the size of the conference center would be reduced, due to the presence of footings and columns for the northern replacement alternatives; however, the overall concepts could be implemented. Development could occur on 3.15 hectares (7.8 acres) of land, including 1.17 hectares (2.9 acres) beneath the structures, subject to review and approval by Caltrans.

The northern alternatives are consistent with the transportation element of the Reuse Plan because they would not modify YBI on- and off-ramps to change the capacity of existing vehicular access. The ramps are not owned by Caltrans and are not critical to providing a lifeline connection in the project corridor. One eastbound on-ramp is proposed for modification under the replacement alternatives, but would not change access capacity to the island. Therefore, Replacement Alternatives N-2 and N-6 would not conflict with the transportation access assumptions of the 1996 Draft Reuse Plan.

Construction-related impacts are discussed in Section 4.14 — Temporary Impacts During Construction Activities.

Caltrans has initiated consultation with the CCSF concerning the impacts of the northern alternatives on reuse plans. Caltrans will continue to coordinate with CCSF through the final design and construction periods.

Replacement Alternative S-4. Replacement Alternative S-4 would locate the replacement structure to the south of the existing East Span and remove the existing bridge. As a result, the project would open up some additional areas for YBI redevelopment. Approximately 0.8 hectare (2.0 acres) of land that is currently occupied by the existing span could become available for development. This would be a beneficial impact as it relates to CCSF's redevelopment of YBI. The area suitable for development would be 3.7 hectares (9.1 acres), including 0.6 hectare (1.4 acre) beneath the structures.

As with the northern alternatives, Replacement Alternative S-4 is consistent with the transportation element of the Reuse Plan.

USCG Property Impacts

The development potential of the USCG property would be impacted by the project build alternatives. In April 1998 as part of the BRAC process, the Navy transferred 4.3 hectares (10.6 acres) to the USCG. Of this land, 1.1 hectares (2.7 acres) is within the project area and approximately 0.41 hectares (1 acre) is developable (the remainder is constrained by steep slopes). No specific master plan has been developed for expansion of the existing USCG facility because the USCG has delayed final master plan preparation pending outcome of the TI BRAC process and final design for the East Span Project.

No-Build Alternative. The No-Build Alternative would not affect existing USCG facilities. The No-Build Alternative would not limit future redevelopment beyond the limitations currently imposed by the existing East Span.

Retrofit Existing Structure Alternative. Expansion of existing columns and footings would not conflict with existing USCG facilities or limit future redevelopment beyond the limitations currently imposed by the existing East Span. Temporary construction impacts are discussed in Section 4.14 — Temporary Impacts During Construction Activities.

Replacement Alternatives N-2 and N-6 (Preferred). The northern replacement alternatives would have no permanent impact on USCG usable land area.

Replacement Alternative S-4. Footings and support columns for Replacement Alternative S-4 would use the southeastern portion of YBI and span approximately 1.5 hectares (3.8 acres) of the 17-hectare (41-acre) USCG facility. USCG land under the bridge could be developed, subject to review and approval by Caltrans. Although the USCG does not have a master plan for the YBI facility, Replacement Alternative S-4 would restrict future facility development.

Oakland Touchdown Area

The Oakland Army Base Reuse Authority (OBRA) is in the process of designating land south of Burma Road for light industrial/research and development uses with supporting retail and business services. BCDC amended the San Francisco Bay Plan and the Seaport Plan in January 2001 to delete this area from the "Port Priority Use" designation to permit implementation of OBRA's plan.

The 1998 Draft Final Reuse Plan for the Oakland Army Base designates 5.9 hectares (14.7 acres) of the westernmost portion of the former Army Base on the Oakland Touchdown as the site of a proposed public park. The OBRA is considering reducing the amount of land to 4.9 hectares (12 acres), but has yet to release a revised Reuse Plan. The proposed Gateway Park is a Section 4(f) resource.

The Port and City of Oakland are participants in a planning effort to establish the Gateway Park at the Oakland Touchdown area. (See discussion of Public Parks and Open Space below.) The Port has stated its intention to work with the Oakland Gateway Planning Group to develop design concepts which accommodate the East Span Project, Port activities, public access, and open space in the Oakland Touchdown area.

No-Build Alternative. The No-Build Alternative would not conflict with OBRA's redevelopment plans.

Retrofit Existing Structure. The Retrofit Existing Structure Alternative would not require the use of the former OARB property and would not conflict with OBRA's redevelopment concepts.

Replacement Alternatives N-2 and N-6 (Preferred). The northern alternatives would not use the former OARB property and would not conflict with OBRA's redevelopment concepts.

Replacement Alternative S-4. Replacement Alternative S-4 would conflict with the proposed public park discussed below but would not conflict with OBRA's other redevelopment concepts.

Oakland Touchdown Area — Public Parks and Urban Open Space

With EBRPD as the lead, planning has been initiated with the City of Oakland, the Port of Oakland, EBRPD, ABAG/Bay Trail, OBRA, National Park Service (NPS), and BCDC to create a Gateway Park at the Oakland Touchdown. Decisions about the replacement alternatives are critical to the park planning process.

No-Build Alternative. The No-Build Alternative would not impact EBRPD development of OBRA-designated parkland on the southern border of the Oakland Touchdown area; therefore, no impact to parkland development would occur and no mitigation would be required.

Retrofit Existing Structure. The Retrofit Existing Structure Alternative would not impact EBRPD development of parkland on the southern border of the Oakland

Touchdown area; therefore, no impact to development of parkland would occur and no mitigation would be required.

Replacement Alternatives N-2 and N-6 (Preferred). The northern alternatives would not impact EBRPD development of parkland on the southern border of the Oakland Touchdown area; therefore, no impact to development of parkland would occur and no mitigation would be required.

Replacement Alternative S-4. Replacement Alternative S-4 would negatively affect the Gateway Park development at the Oakland Touchdown. This alternative would require approximately 3 hectares (7.4 acres) of the proposed 5.9-hectare (14.7-acre) park for construction of the bridge, thereby reducing its size by one-half and bisecting the land designated for park use by OBRA. The park's reduced size and location would limit its intended function as a regionally significant recreational area and as a gateway to the East Bay. To minimize the impact to the proposed Gateway Park, the land required for Replacement Alternative S-4 could be replaced by acquiring land nearby to contribute toward another smaller park in the area. For further information on the park, see Chapter 6 — Section 4(f) Evaluation.

Impacts to Required Bay Access Sites

As part of the I-880/Cypress Freeway Replacement Project, Caltrans is required by BCDC to provide and maintain a public access bicycle/pedestrian pathway system connecting the Cities of Emeryville and Oakland between Shellmound Street and Nelson Mandela Parkway, through the distribution structure for I-80 to the Oakland Touchdown area. Caltrans is also required to provide two scenic overlooks, a 465-square-meter (5,000-square-foot) outlook on the north side of the Oakland Touchdown area and a 232-square-meter (2,500-square-foot) lookout area on the south side of the Touchdown area. Both overlooks include public amenities such as parking, restrooms, benches, a fish cleaning facility, trash cans, and native landscaping. Caltrans submitted a request to BCDC to amend Permit 11-93 to delay implementation of the access areas until completion of East Span construction. On July 31, 1998, BCDC amended Permit 11-93 to extend the period for construction of the public access areas to December 31, 2006. The permit includes an in-lieu-fee provision that allows Caltrans to pay a sum equal to the costs of the required amenities should construction of some or all of the public access prove infeasible. Payment of the in-lieu fee is subject to BCDC approval. BCDC may disburse the funds to the EBRPD to improve public access where feasible. Each replacement alternative would require ongoing consultation with BCDC to determine the optimum locations of these public access overlooks.

No-Build Alternative. The No-Build Alternative would not interfere with implementation of the public access improvements required under BCDC Permit 11-93. No impact would occur and no mitigation would be required.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would not conflict with provision of the public access improvements required under BCDC Permit 11-93.

Replacement Alternatives N-2, N-6 (Preferred), and S-4. Each of the proposed replacement alternatives would have an impact on the public access required under BCDC Permit 11-93. The northern alternatives would preclude construction of the public access overlook required by the BCDC for the northern side of the Oakland Touchdown. Replacement Alternative S-4 would preclude the development of the public access overlook on the south side of the Oakland Touchdown area, bicycle path, access roadway, and parking area required by BCDC Permit 11-93.

Caltrans will consult and coordinate with BCDC to determine necessary public access modifications and/or permit requirements under Permit 11-93. Modifications to the public access requirements could be identified as conditions in a future amendment to Permit 11-93 and/or incorporated into a new permit for a bridge replacement alternative.

4.1.6 Adopted Goals and Policies

The purpose of this section is to evaluate the relationship between the proposed project and existing land use, transportation, and coastal policies which will guide future development in the western and eastern touchdown areas.

Land Use Policies

Treasure Island Draft Reuse Plan (The City and County of San Francisco). The replacement of the East Span would have no impact on CCSF's program to implement the guiding policies of the 1996 Draft Reuse Plan nor on the CCSF's program to implement the goals and policies of the CCSF's Master Plan. The 1996 Draft Reuse Plan and the CCSF's Master Plan both assume that the East Span will continue to provide an essential link for auto traffic between YBI and the East Bay.

As discussed in Section 4.1.5, Replacement Alternatives N-2 and N-6 are generally compatible with the 1996 Draft Reuse Plan. The 1996 Draft Reuse Plan has not been formally adopted, and it would be subject to environmental and regulatory review, which could alter what is currently envisioned for eastern YBI in the draft plan. The DEIR/DEIS for the reuse plan has not been issued yet.

The goals and policies of the 1996 Draft Reuse Plan also identify the existing bridge and ramps as one of the continuing institutional uses on YBI, as the bridge provides an essential link for auto traffic between YBI and the East Bay. Planned uses on the western side of YBI and on Treasure Island would not be affected by the East Span Project.

City of Oakland (Envision Oakland). The East Span Project is consistent with Oakland's policies for future development and land uses within the project area. With the exception of one conflict (discussed in Section 4.1.4 — Impacts to Existing Land Use), replacement of the SFOBB East Span would have no impact on the City's program to implement the goals and policies of the General Plan. Construction of either Replacement Alternative N-2 or N-6 would conflict with the Resource

Conservation Area land use designation, which applies to all of the land on the Oakland Touchdown area, north of the existing alignment. The northern alternatives would displace 0.2 hectare (0.5 acre) of the Resource Conservation Area. The City of Oakland has been an active participant in the planning efforts to establish the Gateway Park. As mentioned previously, Replacement Alternative S-4 would negatively impact Gateway Park development. In the City's comments on the DEIS, Acting Planning Director Leslie Gould noted, "Of the proposal alignments, the City prefers Replacement Alternative N-6 because it would have the fewest impacts on planned land uses."

The SFOBB is an integral part of the existing system that supports Oakland's vision of the City's "primacy as a transportation hub connecting the Bay Area with the Pacific Rim and the rest of the United States (Envision Oakland General Plan)."

The Oakland Touchdown area is located immediately adjacent to the City's seaport area (i.e., Port of Oakland facilities). The seaport area is classified as a showcase district in the City's General Plan. Showcase districts are dynamic areas that can respond to broad trends and market demands. The policy framework of the plan supports these districts in their continued growth and regional importance. The SFOBB provides an important link between the City's showcase districts, San Francisco, and the San Francisco Peninsula.

Oakland Policies T4.5, T4.9, and *T6.3* support preparation of a Bicycle and Pedestrian Master Plan, the creation of a "gateway" public access area at the east terminus of the East Span, and making the waterfront accessible to bicyclists and pedestrians. The East Span Project includes cooperation by Caltrans with planning efforts to create public access areas in the Oakland Touchdown area that will support implementation of these City policies. These characteristics of the SFOBB project also support the Waterfront Goals of the General Plan, relative to promoting public access to the waterfront.

The "New Bay Bridge," as the SFOBB East Span Project is described in Regional Access: Policies in Action, Chapter 3 of the City's General Plan, provides opportunities for increased bicycle, pedestrian, and transit access to the bridge. Additionally, the General Plan recommends that new parks and open space at the Oakland Touchdown should be integral components of the project. The replacement alternatives include features, such as the bicycle and pedestrian facilities which are consistent with the City's policies. All replacement alternatives would accommodate public access through BCDC Permit 11-93 and park development by EBRPD, but Replacement Alternatives N-2 and N-6 substantially more so than Replacement Alternative S-4 because Replacement Alternative S-4 would reduce the size of the proposed park by approximately one-half while Replacement Alternatives N-2 and N-6 would have no impact on the development of the proposed park.

Since the Retrofit Existing Structure Alternative does not provide improved bicycle or pedestrian access, it is not consistent with this Oakland General Plan policy.

Port of Oakland. The SFOBB East Span Project is consistent with the Port and City of Oakland's plans for an office and commercial development along the shoreline of the

Oakland Touchdown area east of the envisioned park. This activity would not be precluded by any of the proposed build alternatives.

U.S. Coast Guard (USCG). The USCG does not currently have a master plan in place for the YBI facility. In general, the USCG plans to maintain its current level of operations at the YBI facility, including 24-hour search and rescue, repair and maintenance of buoys, vessel traffic service, and law enforcement. Replacement Alternatives N-2 and N-6 would not substantially affect current level of operations. Replacement Alternative S-4 would encroach over the USCG facility and would restrict the USCG's ability to utilize its portion of YBI. The replacement bridge would span approximately 1.5 hectares (3.8 acres) of the 17 hectares (41 acres) of USCG property.

East Bay Regional Park District (EBRPD). As noted in earlier sections, the OBRA's 1998 Reuse Plan designates 5.9 hectares (14.7 acres) at the westernmost end of the former OARB property for a Public Benefit Conveyance to the EBRPD for a future park. Construction of Replacement Alternatives N-2 and N-6 and the Retrofit Existing Structure Alternative are consistent with the OBRA Reuse Plan and EBRPD's intention to develop a park after the East Span Project is constructed. Replacement Alternative S-4 would negatively impact the Gateway Park development by taking 3 hectares (7.4 acres) of the proposed park area. (Refer to Chapter 6 — Final Section 4(f) Evaluation for additional information on the proposed Gateway Park and the project alternatives.

Transportation Policies

City of Oakland – Envision Oakland. Oakland's transportation policy includes the following:

Objective T4. *Increase use of alternative modes of transportation.*

Policy T4.8 - Accommodating Multiple Types of Travel on the Bay Bridge. The City should encourage the design and engineering for the new Bay Bridge to accommodate multiple means of access and travel by automobiles, trucks, transit, bicycles, pedestrians, and future mass transit.

Each of the East Span Project replacement alternatives would accommodate multi-modal travel on the bridge. High-occupancy vehicle (HOV) bypass ramps would remain in operation at both the west and east bridge approaches to encourage carpools, vanpools, and bus transit use. Provision for future mass transit would be accommodated by continuation of Alameda-Contra Costa Transit District (AC Transit) bus service and by design of the replacement structures to accommodate loading for future light rail transit vehicles. Replacement alternative designs also include a bicycle/pedestrian path. The proposed project is consistent with this policy.

Policy T4.8 - "Gateway" Public Access Area. The City, in concert with the EBRPD, Port of Oakland, Oakland Base Reuse Authority, and BCDC, should support development of a significant new "gateway" public park area at the terminus of the SFOBB East Span that can be reached by auto, bicycle, or walking.

The East Span Project includes coordination with the agencies concerned with future uses of land in the Oakland Touchdown area. Collaborative planning efforts involving the City of Oakland, Port of Oakland, EBRPD, BCDC, NPS, and the Army are in progress.

City and County of San Francisco Master Plan. The CCSF's transportation policy includes the following:

Objective 1.

Policy 1. Involve citizens in planning and developing transportation facilities and services, and in further defining objectives and policies as they relate to district plans and specific projects.

The East Span Project is consistent with this policy as it has provided many opportunities for public involvement in the process. (See Appendix E for a summary of public involvement activities.)

Objective 4.

Policy 2. Where significant transit service is provided by buses, bridges and freeways should have exclusive bus lanes.

Efficient bus operations as part of the East Span Project alternatives are facilitated by provision of bus/carpool (HOV) bypass lanes at the west and east bridge approaches. Provision of exclusive bus lanes has been considered as part of the East Span Project. It was determined that dedicated facilities would not provide any benefits. (See Section 2.5.)

Objective 5.

Policy 3. The existing vehicular capacity of the bridges, highways and freeways should not be increased and should be reduced where possible.

The East Span Project is consistent with this policy as it does not increase capacity.

Objective 8.

Policy 4. Accommodate bicycles on regional transit facilities and important regional transportation links.

The East Span Project replacement alternatives include designs for a bicycle/pedestrian path. The replacement alternatives are consistent with this policy.

Association of Bay Area Governments – The Bay Trail. ABAG's plans for trails include the following:

Transportation Access Policies.

30. *Bridges and roads will be important connections in the Bay Trail system, providing not only commute routes, but enhancing the recreational use of the Trail by creating trail loops which will allow a greater number of people to enjoy the Trail.*

31. *In the short term, attention should be focused on improving safe access to the bridges, possible expansion of bicycle shuttle services, and public transit accommodations of bicycles to allow crossbay access.*

32. *In the long term, unconstrained access on bridge structures is preferred. This can more easily be accomplished in planning future facilities, as long as public access is a requirement for new structures. Legislative action which would require bicycle and pedestrian access on new facilities should be actively sought.*

33. *Opportunities for cooperative funding of pedestrian and bicycle accessways should be investigated in order to make financing feasible.*

The East Span Project would be consistent with these policies because the replacement alternatives would provide the first link of a transbay crossing by providing a path to YBI. (The feasibility of a West Span path is under review by the MTC and Caltrans.) A path on the East Span would be an important connection to Bay Trails on both sides of the Bay. The East Span Project would improve access to the bridge and would enhance the safety of the bridge itself. The bicycle/pedestrian path is to be funded as outlined in Section 188 of the California Streets and Highways Code (CSHC).

San Francisco Bay Plan (Bay Conservation and Development Commission) Policies.

Land Use. BCDC requires that every project provide the maximum feasible public access to the Bay consistent with the project. In planning meetings for the conceptual Gateway Park at the Oakland Touchdown area, BCDC concurred that it would consider combining the requirements for public access specified in Permit 11-93 with any additional public access requirements for the East Span Project. (Note: Section 60604.5 of the Streets and Highways Code states, "Notwithstanding any other provision of law, local and state permitting authorities shall not impose any requirement that a bicycle, pedestrian, or mass transit facility be constructed on the San Francisco-Oakland Bay Bridge as a condition for issuing any permit, granting any easement, or granting any other form of approval needed, for the construction of a new bridge." As a result of this law, BCDC cannot require a bicycle or pedestrian facility on the bridge as a permit condition.)

The East Span Project would be consistent with BCDC's public access policy as Caltrans would provide bicycle, pedestrian, and vehicular access to the Oakland

Touchdown area as part of both the East Span Project and BCDC's previous conditions of approval for the I-880 and I-80 projects (see the Permit 11-93 discussion in Section 3.1.3 — Adopted Goals and Policies for further details). Public access to the Bay is required as part of the I-880 and I-80 projects. If the public access improvements, including the overlooks and bikeway alignments prove infeasible due to replacement of the bridge, the permit conditions allow Caltrans to pay an in-lieu fee to construct the improvements subject to BCDC approval. BCDC may disburse the funds to the EBRPD or another entity to improve public access where feasible.

The proposed project is consistent with the BCDC's policies for future development as contained in the San Francisco Bay Plan and the Seaport Plan; the replacement of the East Span would have no impact on the BCDC's program to promote its policies guiding land use and development around the Bay. The Bay Plan strongly encourages that new transportation facilities be designed to encourage use of mass transit. The proposed project is consistent with this policy, as the proposed alternatives would maintain the HOV bypass lanes at the toll plaza and west approach that presently take buses and carpools around congestion points. The Bay Plan also strongly encourages development and use of public parks. The configuration of overlooks required as part of the I-880 and I-80 projects would be affected by the East Span Project. Given the intent of EBRPD and other parties to provide a much larger area for public access and amenities south of the bridge, public access requirements for parks and overlooks are expected to be fulfilled with any replacement alternative, though with a lesser quality park configuration under Replacement Alternative S-4. EBRPD plans for the Gateway Park are independent of the East Span Project.

Transportation. The BCDC Bay Plan includes the following:

Policy 4. *If a route must be located across a waterway, the following provisions should apply:*

a. The crossing should be placed on a bridge or in a tunnel, not on solid fill.

b. Structures should provide adequate clearance for commercial ships, Navy ships, and pleasure boats to have uninterrupted passage at all times.

c. Toll plazas, service yards, or other ancillary features should not be located on new fill.

d. To provide maximum ultimate capacity on any new route that is allowed over or under a waterway (and thus to minimize the number that might have to be allowed in the Bay), the design of the route should, if feasible, accommodate future mass transit facilities and subsequent installation of automatic power and guidance elements for vehicles.

The East Span Project is consistent with BCDC policy "a". All alternatives propose a bridge crossing. Concerning policy "b", the height of all alternatives under consideration has been set in consultation with the USCG to provide adequate navigational clearance. Project alternatives would not require new fill for ancillary

facilities. The project alternatives are, therefore, consistent with policy "c". Although the project does not propose a new route over the Bay, project alternatives are consistent with policy "d" in that consideration is being given to accommodation of structural loading requirements for future light rail transit.

Dredging and Fill. Bay Plan Dredging Policy 2 establishes a preferential hierarchy for disposing of dredged material. This hierarchy is intended to minimize impacts to the Bay from dredge disposal activities. The policy states that dredged material should be disposed of by:

- Placement as fill in approved locations;
- Ocean disposal;
- Dry land disposal; and
- In-Bay disposal at designated locations.

Dredging required for the project would result from construction activities (see Section 4.14.10 — Construction Excavation and Dredging). Caltrans has initiated consultation with BCDC and other regulatory agencies through the Dredged Material Management Office (DMMO) concerning disposal of dredged materials (see correspondence in Appendix G). Dredged material would be disposed of at locations approved by the DMMO and subject to BCDC review for policy consistency.

Section 66605 of the McAteer-Petris Act (discussed in Section 3.1 — Community Setting) and the Bay Plan regulate Bay fill, requiring that fill be minimized and permitted only if it meets certain conditions. Under Section 66605, bridges are considered to be water-oriented uses for which fill can be placed in the Bay. (Refer to Section 4.9.1 — Placement of Fill in the San Francisco Bay for a discussion of Bay fill quantities.) Permanent Bay fill associated with the build alternatives include bridge piles, pile caps, piers, and decks, and engineered fill for the westbound roadway and Caltrans' maintenance road at the Oakland Touchdown area. Temporary Bay fill associated with the build alternatives include trestles, falsework, cofferdams, barge mooring facilities, and other construction facilities.

Visual. Bay Plan policies related to the appearance and design of bridge structures and the visual prominence of bridge towers are advisory only. Policies relating to maximizing views to the Bay from bridges are enforceable. The Retrofit Existing Structure Alternative is generally consistent with these policies because it would not change existing railing heights or add substantial new superstructure that would decrease motorists' views. Modifications to the substructure including addition of two bridge columns and expansion of existing columns would not change the basic visual form of the existing structure.

The replacement alternatives are consistent with the Bay Plan's visual policies. Bay Plan policies concerning views to and from the bridge and tower type and design were incorporated into design recommendations developed by the Metropolitan Transportation Commission's (MTC's) Bay Bridge Design Task Force (Task Force) and the Engineering and Design Advisory Panel (see Appendix E).

Construction of the build alternatives (including the Retrofit Existing Structure Alternative) would require a permit from BCDC pursuant to the McAteer-Petris Act and a concurrence from BCDC that the project is consistent with the Commission's federally approved Coastal Zone Management Program (CZMP). Both the required development permit and the concurrence must establish that construction of the replacement alternatives is consistent with the McAteer-Petris Act, the San Francisco Bay Plan (including the "Park Priority Use" designation at YBI), and the Seaport Plan.

Caltrans has initiated consultation with BCDC concerning consistency of the East Span Project with the Commission's CZMP. In a letter dated February 4, 2000, BCDC provided a preliminary concurrence for the East Span Project. (Refer to Appendix G: Agency Consultation Letters.)

After the Record of Decision has been approved, the FEIS and detailed engineering will be provided to BCDC during final project design for its use in the federal consistency concurrence and Bay Plan permit process.

4.2 TRANSPORTATION

Each of the proposed alternatives would retain five eastbound and five westbound traffic lanes on the East Span. Replacement alternatives would require roadway modifications on YBI and the Oakland Touchdown area (as summarized below), but none of the alternatives would create long-term impacts to local traffic, transit, and maritime traffic. Construction-related impacts are discussed in Section 4.14 — Temporary Impacts During Construction Activities.

4.2.1 Vehicular Circulation and Access

For each alternative, changes in vehicular traffic circulation, operations, and access are identified and design considerations are described that would be incorporated into the alternatives.

SFOBB Traffic Operations

Traffic operations under the No-Build Alternative and the Retrofit Existing Structure Alternative would remain the same as under existing conditions. Each of the East Span replacement alternatives may improve traffic operations on the SFOBB: the addition of 3-meter (10-foot) shoulders on both sides of the roadway would provide refuge for disabled vehicles. This may reduce non-recurrent congestion caused by minor accidents or stalls that block one or more lanes of traffic. However, the extent of non-recurrent congestion caused by major incidents is unlikely to be affected by the addition of shoulders. The addition of shoulders would also reduce the number of lane closures for maintenance.

During traffic incidents, all of the proposed replacement alternatives for the East Span Project may experience traffic operational impacts in the opposite travel direction from the incident as a result of rubbernecking. When an incident occurs on a typical freeway segment, secondary congestion frequently occurs in the opposite direction of travel as a result of drivers slowing to view the incident. When an incident occurs on either the upper or lower deck of the existing SFOBB, there is currently no impact to traffic headed in the opposite direction because drivers are unable to see opposing traffic or incidents. The proposed replacement structures would place eastbound and westbound traffic at the same level and 15 meters (50 feet) apart, creating opportunities for drivers to see incidents on the opposite structure, which may cause delays in the non-incident travel direction.

Yerba Buena Island

There would be no long-term impacts to traffic circulation, access, or transit operations on YBI from the No-Build Alternative, Retrofit Existing Structure Alternative, or the replacement alternatives. The replacement alternatives would, however, create long-term changes in the alignment of certain YBI roadways as described below. These roadway modifications would be required for each replacement alternative. No loss of access would result under the replacement alternatives. Neither the No-Build nor the Retrofit Existing Structure Alternative would require long-term roadway modifications.

Required roadway modifications as a result of the Preferred Alternative are described in detail in Section 2.6.2 — Bridge Replacement Alternatives and summarized below:

- Macalla Road would be lowered approximately 1 meter (3 feet) and realigned to avoid bridge columns and connect with a modified Southgate Road. All existing access to Macalla Road would be maintained;

- Southgate Road would be realigned both horizontally (13 meters [43 feet] east) and vertically (up to 3 meters [10 feet]). All existing access would be maintained;

- The USCG Road would be realigned 20 meters (66 feet) south to avoid the columns of the new bridge. Construction would include a new gate and guard shack for the USCG facility; and

- A portion of the access road leading to Building 262 would be permanently realigned approximately 15 meters (49 feet) to the south. The realigned portion would become a two-lane roadway that would conform to the existing single-lane dirt road approximately 115 meters (377 feet) from the eastern end of YBI.

The vertical and horizontal changes to the roadways would be slightly different for each replacement alternative, depending on the bridge alignment.

Oakland Touchdown Area

No-Build Alternative, Retrofit Existing Structure Alternative, Replacement Alternatives N-2 and N-6 (Preferred). The No-Build Alternative, Retrofit Existing Structure Alternative, and Replacement Alternatives N-2 and N-6 would have no long-term impacts to traffic circulation, access, or transit. Under the northern replacement alternatives, the existing Caltrans maintenance road would be realigned, but there would be no loss of access.

Replacement Alternative S-4. Replacement Alternative S-4 would not affect existing transit service in the Oakland Touchdown area, but would require modification of existing access patterns.

Under Replacement Alternative S-4, the existing Caltrans maintenance road would need to be realigned (see Figures 2-11.4 and 2-11.5 in Appendix A). The southern shoreline east of Replacement Alternative S-4 would continue to be accessed by Burma Road, which would be truncated at existing Terminal Seven. The portion of Burma Road that would be eliminated would not affect traffic circulation or access to any buildings in the area. No loss of access would occur to Caltrans maintenance buildings because access would be configured to the south using the realigned maintenance road. The vertical clearance between the new bridge approach structure and the EBMUD service road would be insufficient to allow large delivery truck access to the EBMUD dechlorination facility. Relocation of the service road, the facility, or both would be required (see Section 4.1.4 — Impacts to Existing Land Use for further discussion).

Local access roadway reconfigurations would be part of the construction of Replacement Alternative S-4. Realigned access roadways would serve existing facilities and any future park development, with the exception of the dechlorination facility. Relocation of the dechlorination facility is discussed in Section 4.1.4 — Impacts to Existing Land Use. No other impacts due to change in access would result; therefore, no mitigation is proposed.

4.2.2 Non-Motorized Traffic: Bicycles and Pedestrians

Pedestrian and non-motorized traffic are currently prohibited on the existing East Span and no dedicated, signed bicycle/pedestrian paths currently exist within the project area. Project alternatives have been assessed for the potential to accommodate planned and proposed pathway connections, and the replacement alternatives each incorporate a bicycle/pedestrian path.

Citizen participation in planning for the bicycle/pedestrian path on the East Span has been facilitated by the MTC and Caltrans through the Bay Bridge Bicycle/Pedestrian Advisory Committee (BPAC).

Yerba Buena Island

Project alternatives have no permanent impacts to bicycle and pedestrian circulation on YBI. The 1996 Draft Reuse Plan proposes bicycle and pedestrian modes as the primary modes of transportation on YBI. There are currently no signed bicycle paths or lanes on YBI and the Navy and the CCSF have no plan in place for the creation of bicycle/pedestrian facilities on the island. Bicycle and pedestrian use of public street rights-of-way on YBI would be possible under any East Span Project alternative. The bicycle/pedestrian path proposed for the Preferred Alternative (Replacement Alternative N-6) and Replacement Alternatives N-2 and S-4 would terminate on the eastern side of YBI. In the final design phase for a replacement alternative, Caltrans would work with the Navy and/or the CCSF to design appropriate path connections to the local roadway network. Caltrans would consult with the Navy and/or other property owners on YBI about their interest in having directional signage installed for path users on the bridge. If consultation results in agreement on the nature and placement of the signs, Caltrans would install the signage. To the extent the Navy and CCSF believe the SFOBB bicycle/pedestrian path would create excessive demand on Navy/CCSF facilities on YBI, Caltrans would limit access to YBI at the request of the Navy and/or the CCSF. Should the Navy or the CCSF desire YBI access to be specifically directed, limited, or prohibited, Caltrans would work with these agencies to design signage or barriers. Caltrans does not have responsibility or authority for areas of YBI and TI once path users leave the path on the East Span.

Caltrans and MTC are currently preparing a feasibility study for a possible bicycle/pedestrian/maintenance path from San Francisco across the West Span and a connection around YBI to a path on the replacement East Span. The preliminary design in this study locates the potential West Span path at the upper deck level outward of the existing stiffening trusses on both sides of the West Span. The pathway would descend into San Francisco on elevated structures west of the current San Francisco anchorage and terminate near the intersection of Harrison and Fremont

Streets. East of the YBI anchorage, the path would continue on elevated structures which would connect to an at-grade path along the south side of YBI, generally along the existing Treasure Island Road, that would then connect to the East Span path. Any future pathway on the West Span and on YBI would be a separate project. The East Span path could accommodate connections to a possible path on the West Span.

Oakland Touchdown Area

No-Build and Retrofit Existing Structure Alternatives. The No-Build and Retrofit Existing Structure Alternatives would have no impacts to bicycle and pedestrian circulation in the Oakland Touchdown area.

Replacement Alternatives. The replacement alternatives, including the Preferred Alternative (Replacement Alternative N-6), would create no negative impacts to bicycle and pedestrian circulation in the Oakland Touchdown area. Access to and from the replacement alternatives would be from the south side of the eastbound structure. Each of the replacement alternatives would provide bicycle/pedestrian access to the bridge and would provide sufficient vertical clearance where necessary to permit a bicycle and rider to travel under bridge structures. The Bay Trail would connect with the East Span structure from West Oakland along a bikeway adjacent to I-80 to be provided by Caltrans under the requirements of BCDC Permit 11-93. This Oakland-to-Emeryville segment of the Bay Trail will be funded by Caltrans as part of the I/880 Cypress Freeway Replacement Project. Implementation of this Bay Trail segment will be coordinated with the East Span Project and Gateway Park plans.

East Span Bicycle/Pedestrian Access

Proposed alternatives have been evaluated for their potential to provide bicycle and pedestrian access to and on the East Span. Criteria used to assess project impacts are:

- Ability to incorporate a bicycle and pedestrian path on the East Span;
- Suitability of profile grades; and
- Connectivity to bicycle and pedestrian access at either the Oakland Touchdown area or YBI.

No-Build and the Retrofit Existing Structure Alternatives.

Path Accommodation and Placement. The No-Build and the Retrofit Existing Structure Alternatives do not incorporate a new bicycle and pedestrian path. The existing cross section of the bridge has five 3.5-meter (11.7-foot) travel lanes with no roadway shoulders, limiting the ability to restripe the bridge deck to accommodate a path on the bridge. It may be possible to add a bicycle/pedestrian path to the existing bridge in the future under the No-Build or Retrofit Existing Structure Alternatives; however, MTC has provided funding only for a path on a replacement alternative.

Replacement Alternatives N-2, N-6 (Preferred), and S-4.
Path Accommodation. A bicycle and pedestrian path has been incorporated into each replacement alternative (see Figure 2-8 in Appendix A). A path would be constructed on the south side of the eastbound structure for each replacement alternative. The path would be 4.7 meters (15.5 feet) wide and 0.3 meter (1 foot) higher than the adjacent travel lanes and would include viewing areas, referred to as belvederes. The five belvederes on the skyway would be approximately 12 meters (39 feet) long by 1.2 meters (4 feet) deep. Caltrans is still investigating whether to include one or two belvederes on the main span; they would be 20 meters (66 feet) long by 1.2 meters (4 feet) deep. This configuration was developed with input from the BPAC and was approved by the MTC. Provision of bicycle/pedestrian access on the East Span would be a beneficial impact.

Consistency with Local Plans and Policies
Each of the East Span replacement alternatives, including the Preferred Alternative, would provide a bicycle and pedestrian path between YBI and the Oakland Touchdown area. Provision of the path would be consistent with the following local plans:

- City and County of San Francisco, Naval Station Treasure Island Draft Reuse Plan;
- San Francisco Bay Conservation and Development Commission, Bay Plan;
- City of Oakland, Pedestrian and Bicycle Master Plan; and
- Association of Bay Area Governments, Bay Trail Plan.

Impacts to SFOBB Bicycle Shuttle Service
All East Span Project alternatives could accommodate the existing Caltrans bicycle shuttle service.

4.2.3 Parking

For each alternative, changes in long-term parking supply resulting from project alternatives have been identified. It should be noted that Caltrans' temporary construction easement (TCE) includes the majority of the Parade Grounds, where YBI parking is available. A small portion of the Parade Grounds is owned by Caltrans. The TCE shall terminate when Caltrans determines that it no longer is required , at which time the property will revert to the federal government.

Yerba Buena Island
No-Build Alternative. The No-Build Alternative would not modify the number of parking spaces on YBI.

Retrofit Existing Structure. Strengthening of existing Column YB3 under the Retrofit Existing Structure Alternative would eliminate approximately four informal parking spaces in the paved area east of Quarters 1. Given the large undeveloped area available for parking, the loss of four parking spaces at the eastern end of this area would not contribute to unmet parking demand and would not create an impact. No mitigation would be necessary for this minor change in parking supply.

Replacement Alternatives. Each of the East Span Replacement Alternatives, including the Preferred Alternative, would eliminate between 6 and 8 informal parking spaces in the paved area east of Quarters 1. Given the large undeveloped area available for parking, the loss of this small number of parking spaces would not contribute to unmet parking demand and would not create an impact. No mitigation would be necessary for this minor change in parking supply.

Oakland Touchdown Area

There would be no long-term loss of parking spaces under any of the project alternatives. The project would add day-use parking as part of public access. There would be a new parking lot near the entrance to the bicycle/pedestrian path on the bridge. The parking lot would be temporary to avoid conflicts with plans for the Gateway Park and could eventually be incorporated into the park design. The size of the lot is undetermined at this time, but would, at a minimum, satisfy the parking requirements of BCDC Permit 11-93 for six parking spaces.

4.2.4 Marine Traffic

The potential for ship collisions with the East Span alternatives has been evaluated. Impacts to the structures from vessel types likely to use the waters under the bridge are presented below.

Methodology

Information regarding type, size, and frequency of vessels that use the shipping channel east of YBI was collected to determine vessels likely to pass under the East Span in open water. The largest vessels currently using the main navigation opening are fuel barges traveling to and from the oil refinery at Point Richmond.

American Association of State Highway and Transportation Officials (AASHTO) specifications[3] were used to estimate impact loads on towers and columns. Head-on and side-impact collisions were considered. To evaluate worst-case impacts, it was assumed that cruise ships could use the east channel under potential development scenarios for TI. The vessel's speed, mass, and crushing of its hull were considered in developing impact loads. Cruise ships, being larger than existing barges using the eastern navigation channel, would generate the largest impact loads.

No-Build Alternative

The No-Build Alternative would not modify the existing East Span and would not change navigation patterns through the main navigation opening. No modifications to the bridge are proposed under this alternative; therefore, no modifications would be constructed to minimize impacts of future ship collisions. Should a collision occur, existing fenders would protect the existing bridge. Existing deteriorated fenders are being repaired, and these fender systems would also be repaired as required following vessel collisions.

[3] AASHTO Guide Specifications and Commentary for Vessel Collision Design of Highway Bridges, Volume I: Final Report, February 1991, American Association of State Highway and Transportation Officials, Washington, D.C.

Retrofit Existing Structure Alternative

The Retrofit Existing Structure Alternative would strengthen existing columns in the main navigation opening, shorten spans, increase the ability of the structure to withstand impact from a maximum-design cruise ship at the main span columns and impacts of barges at the shorter span columns. More columns would increase the likelihood of a collision between a vessel and a column. The additional columns would also narrow the existing main navigation opening. The alternative would maintain a width of at least 147 meters (481 feet) between columns in the main navigation opening, and a vertical clearance of 42 meters (138 feet) over mean high water. The resulting channel width, while slightly less than the 152 meters (500 feet) recommended by the USCG,[4] would be adequate for navigation. Following construction of Columns E2A and E2B in the existing main navigation opening, column protection, such as fenders, would be needed at least in the three new main navigation openings. The USCG is evaluating whether or not column protection would be needed in other navigation openings. Column protection would be provided where identified as necessary by the USCG.

Replacement Alternatives N-2, N-6 (Preferred), and S-4

As part of the bridge design, protective fenders are proposed at the main tower and skyway columns to provide sufficient standoff to prevent vessels from hitting columns and reduce pile cap damage on impact. The fenders could be either pile-supported or pile cap-mounted. One possible fender system would have a timber-rubbing face and remain elastic up to a particular level of impact energy. Beyond this level, it absorbs energy by damage to the concrete and timber, but is designed to be easily repaired. The system also provides a wearing surface on the column for minor collisions and bumps from merchant and recreational vessels.

All skyway foundations would be able to withstand the impact of a light drifting barge, and skyway columns would be able to withstand the maximum-design barge impact. The main towers and skyway column foundations would be capable of sustaining impacts for the maximum-design cruise ship.

No potential for significant damage to replacement structures has been identified, due to design of columns and fender systems, and no mitigation is required.

Each of the replacement alternatives would narrow the existing main navigation opening approximately 57 meters (187 feet). The replacement alternatives would have a navigation opening width of 348 meters (1,142 feet) and a vertical clearance of 43 meters (140 feet) over mean high water, and the resulting horizontal and vertical clearance would conform to USCG recommendations. The project would install all applicable navigation aids, such as fenders and lights.

[4] U.S. Coast Guard. Facsimile transmittal from Wayne Till (USCG) to Tony Wong (Caltrans). March 6, 1997.

4.2.5 Air Traffic

The No-Build and Retrofit Existing Structure Alternatives would not change the location or height of towers and would not require changes to obstruction markings or lighting to alert aircraft to the presence of the existing East Span.

The replacement alternatives, including the Preferred Alternative, would change existing obstruction markings and lighting. Federal Aviation Administration (FAA) Form 7460-1, "Notice of Proposed Construction or Alteration," would be filed with the FAA. The form would disclose the location and height of a cable-supported tower. The main span tower of the replacement alternatives would be higher than 150 meters (500 feet) above mean sea level and would require warning lights. Warning lights are required because the tower would exceed 61 meters (200 feet), which is FAA's maximum height for which warning lights are not required.

4.3 VISUAL IMPACT ANALYSIS

The purpose of the visual impact analysis is to evaluate the large-scale visual impacts of the project on the Bay Area.

The focus of the visual impact assessment is on the visual impacts of the Retrofit Existing Structure Alternative and design variations of the replacement alternatives (skyway and main span) and alignments of replacement alternatives (Replacement Alternatives N-2, N-6, and S-4) in terms of visual obstruction, dominance within the viewshed, and design quality in terms of vividness, intactness, and unity. These issues are also considered with respect to the types of viewers that would be affected by the project (residents, office workers, motorists, pedestrians, bicyclists, and recreational users).

The visual simulation figures (4-4 through 4-17c) in Appendix A include the Retrofit Existing Structure Alternative and Replacement Alternatives N-6 and S-4. Replacement Alternatives N-6 and S-4 were chosen because they demonstrate most clearly the differences between a northern and southern alignment. Replacement Alternative N-2 was not used in the photo simulations because it is located between the two other alternatives and would not enhance the representation of differences between a northern and southern alignment.

The following sections describe the visual impacts of the various project alternatives on each of the landscape units which make up the project area (Section 4.3.1), as well as the changes in visual quality that would be experienced from the 20 representative viewpoints around the Bay Area (Section 4.3.2). The changes in visual quality for motorists traveling on the East Span are also discussed (Section 4.3.3). Impacts and mitigation for tree removal and slope disturbance are summarized in Section 4.3.4.

Various bridge types other than cable-stayed, self-anchored suspension (preferred design variation), and skyway designs are not discussed in this section. An earlier process was established to evaluate the merits of these other bridge design types. The process began with meetings of the MTC Bay Bridge Design Task Force. The Task Force initiated an open request for ideas about the design of the main span of the East Span and held numerous public meetings. The Task Force also received an evaluation of various designs by a distinguished panel of engineering and architectural experts (the Engineering and Design Advisory Panel) and elected officials. (See Appendix E — Consultation and Coordination for more details.)

4.3.1 Visual Impacts Resulting in Changes Within Landscape Units

Landscape units are geographically distinct portions of the study area which have a particular visual character. The change to each of the five landscape units described in Section 3.3.2 — Existing Landscape Units and Visual Image Types was assessed for each of the four build alternatives and a number of design variations. The impact on landscape units and visual image types is evaluated for the period when the bridge is in full operation. Each landscape unit would be affected differently according to the combination of these alternative/design variations.

Yerba Buena Island

Retrofit Existing Structure Alternative. The retrofit alternative would not require alteration of visual features on the island. Operations would be identical to what exists today. All visual image types within this landscape unit would remain intact. Adding substantial structural members on the outside of the cantilever superstructure would add clutter and mass to existing bridge.

Skyway/Main Span Design Variations. Following construction and dismantling of the existing bridge, the YBI landscape unit would appear altered by the removal of portions of woodlands to the north and south of the span. The removal of vegetation would be a substantial alteration of this landscape unit and, depending on the size and species of the replacement planting, would require approximately 10 to 20 years to reestablish itself to its current density. It is probable, depending on the amount of clearing required, that residential structures currently obscured by the vegetation would become visible. Mitigation is discussed in Section 4.3.4 — Impacts Due to the Removal of Vegetation and Slope Disturbance.

The slope to the south of the East Span is extremely steep and, though the steepness of the slope would restrict the amount of construction activity which could take place on it, some access would be necessary to construct temporary and permanent columns on and near the slope. The appearance of this part of the slope may be permanently altered after construction, since the extreme angle of the slope and the characteristics of the underlying geology may not permit the slope to be returned to its original grade.

In addition, the footprint of the bridge itself would be altered because the single-deck roadway design would be more than three times the width of the existing span and require approximately 25-30 columns which would affect views to and from the island.

Replacement Alternative S-4 would reduce the size of the USCG facilities, although the structures that could be removed are not currently visible from the existing span. Similarly, Replacement Alternatives N-6 (Preferred) and N-2 would reduce the image type represented by removing Buildings 30, 40, 75, and 270. These structures are not currently visible from the existing span.

Main Span

Retrofit Existing Structure Alternative. Following the seismic strengthening measures, the landscape unit would reflect a slight increase in view blockage as a result of the introduction of two new columns, encasing other columns, and the installation of cross pieces. This would not be considered a substantial visual impact. The Bay would remain the predominant visual image type within this landscape unit.

Skyway Design Variation. Following the construction and dismantling period, this landscape unit would appear much different. The bridge deck would exhibit a much thinner profile than the existing structure because the cantilever element would not be present. In addition, the bridge would be a single-deck rather than a double-deck roadway. The steel cross beams that extend from the upper to lower deck on the existing structure would no longer be present. The skyway design variation profile

would consist of a simple concrete sidewall along either side of the deck, reading like a ribbon from points north and south. The predominant visual image type within this landscape unit would be the Bay.

Main Span Bridge Design Variation. Following the construction and dismantling period, the landscape unit would be dominated by a much taller and different tower element. The contrast between the existing cantilever and truss elements and the proposed single-tower element would be dramatic. The bridge would also be modified through the removal of the double-deck roadway. The single-deck side-by-side roadway would produce a much thinner profile, and the image of the bridge would be sleeker and lighter, because there would no longer be steel beams connecting the upper and lower decks. The predominant visual image type would remain the Bay.

Incline Section

Retrofit Existing Structure Alternative. The retrofit alternative would produce the least amount of change from the existing span. The span would continue to have two bridge decks connected by steel beams. The predominant visual image type of the incline section would remain the Bay. No change in the SFOBB's alignment would occur, and the bridge would appear visually much as it does today.

Skyway/Main Span Bridge Design Variations. Both the skyway and main span design variations would provide a skyway deck along this portion of the span. The greatest change to this landscape unit involves the replacement of the existing double-deck structure with side-by-side single decks. This change would cause the bridge to be more than double in width, while the height of the deck area would be reduced as a result of the reduced height of the bridge rail and the absence of the upper deck.

Replacement Alternative S-4 would offer the greatest change in viewshed as it follows a more southerly alignment, while Replacement Alternatives N-6 (Preferred) and N-2 remain closer to the SFOBB's existing alignment along this section of the bridge.

Oakland Touchdown

Retrofit Existing Structure Alternative. The retrofit alternative would produce the least amount of change from the existing span. The visual image types currently present at the touchdown area would not be altered with the implementation of the retrofit alternative. The alignment of the East Span would not change and additional right of way would not be required for its construction. The predominant visual image types would remain marsh and estuary areas and light industrial.

Skyway/Main Span Bridge Design Variations. Replacement Alternatives N-6 (Preferred) and N-2 would require construction within a portion of the area to the north of the existing span designated for resource conservation by the City of Oakland. Replacement Alternative S-4 would require construction within undeveloped and light industrial land to the south of the existing span. The result of this change in the SFOBB's existing alignment would be a reduction in the visual image types (marsh, estuary, and light industrial) associated with the land taken by the replacement alternatives. Replacement Alternatives N-2 and N-6 (Preferred) may involve adding fill

along the north side of the Oakland Touchdown to support bridge approach structures. Addition of fill would change the appearance of this portion of the touchdown.

The bridge itself would produce a much narrower profile and would be a lighter, more streamlined structure. The steel cross beams that currently extend between decks would not be present, and the single decks would be placed side by side rather than stacked one on top of another. The structure would be similar to what exists today as the bridge at this point is rejoining the SFOBB's existing alignment as it approaches the toll plaza.

SFOBB Toll Plaza

The toll plaza area would not undergo substantial change as a result of the project. The proposed replacement alternatives, including the Preferred Alternative, would rejoin the existing roadway at the toll plaza. The location of the toll booths would not change, and the realignment of the roadway to the north or south would not substantially affect the existing visual appearance of this landscape unit.

4.3.2 Impacts on Views from the Bridge

The following section describes the visual changes that motorists traveling on the SFOBB East Span would experience under the retrofit and replacement alternatives. To aid in this evaluation, an animation of the motorists' views was created for the replacement alternative's main span bridge design variations. Still pictures of key views from this animation are presented in Figures 4-2 to 4-3b in Appendix A. The complete set of animation is provided on a CD-ROM included in the Visual Impact Assessment Report which can be reviewed at locations identified in the Preface and on the worldwide web at www.dot.ca.gov/dist4.

Retrofit Existing Structure Alternative

The retrofit alternative would only slightly change motorists' views from the existing East Span. The current double-deck structure would be maintained, including its solid steel sidewalls that block some motorists' views of the Bay. Steel crossbeams that extend from the upper to the lower deck would be modified to permit large displacements at specified joints. As a result, views would continue to be restricted, especially in the eastbound direction where the presence of the westbound deck overhead results in a further obstruction to the viewshed. Adding substantial structural members on the outside of the cantilever superstructure would add clutter and mass to the existing bridge.

Skyway Design Variation

The skyway design variation would result in substantial changes to the motorists' view, because it would create side-by-side roadway decks with concrete side barriers and railings designed to facilitate views from the structure unlike the existing structure that has steel cross beams that extend from the upper to the lower structure. Because the skyway design variation would not include a main span tower, views would remain unobstructed throughout the length of the East Span.

With Replacement Alternatives N-6 (Preferred) and S-4, views toward the skyline of San Francisco would be expanded for westbound travelers, while Replacement Alternative N-2 would produce views similar to the existing span. Eastbound travelers would experience expansive views toward the Port of Oakland and toward the hills above the communities of Oakland, Berkeley, and Alameda, although visibility to the south may be compromised by the presence of a 4.7-meter (15.5-foot) wide bicycle/pedestrian lane and railings.

Although views from the East Span with the skyway design variation would be greatly expanded, three design issues would have an impact upon the extent of views from the structure. First, the roadways would be placed side by side. The impact of side-by-side roadways would be that viewers would have a five-lane roadway in the foreground of their view to the north (when traveling in the eastbound direction) or south (when traveling in the westbound direction). Second, the addition of a 3-meter (10-foot) shoulder on each side of the roadway further expands the structure in the motorists' foreground view. Finally, the creation of a 4.7-meter (15.5-foot) wide bicycle/pedestrian path on the south side of the eastbound bridge deck would affect views southward from the East Span. The bicycle and pedestrian lane would be raised 0.3 meter (1 foot) above the flow of auto traffic, further restricting views to the south.

When comparing replacement alternatives, Replacement Alternatives N-6 (Preferred) and S-4 would expand westbound views toward San Francisco by allowing views around YBI, because of their northerly and southerly locations, respectively, in comparison with the existing East Span. Replacement Alternative N-2 would expand views to a lesser degree because it closely follows the alignment of the existing East Span.

Main Span Design Variations

The main span design variations would also expand views from the East Span because, as with the skyway design variation, the East Span would be constructed with side-by-side roadways, concrete side barriers, and railings designed to facilitate views from the structure. The main span tower and cables would somewhat obstruct views as vehicles pass through the main span section. However, overall views would increase greatly when compared with the existing structure. In addition, views of the towers and cables while driving on the incline would increase the vividness of the view from the incline.

As with the skyway design variation, Replacement Alternative N-6 (Preferred) and Replacement Alternative S-4 would produce expanded views toward the skyline of San Francisco for westbound travelers, while Replacement Alternative N-2 would produce an effect similar to the existing span. Eastbound travelers would experience expansive views toward the Port of Oakland and toward the hills above the communities of Oakland, Berkeley, and Alameda, although views to the south may be compromised by the presence of a 4.7-meter (15.5-foot) wide bicycle/pedestrian lane and railings.

The design issues noted above for the skyway design variation would have a similar impact on views from the main span tower. The creation of side-by-side single decks, the addition of 3-meter (10-foot) shoulders, and the construction of a 4.7-meter (15.5-

foot) bicycle/pedestrian path would restrict views from the East Span to the north and south. Figures 4-2, 4-3a, and 4-3b in Appendix A depict a motorist's view while driving on the main span variation.

When comparing replacement alternatives, Replacement Alternatives N-6 (Preferred) and S-4 would expand westbound views toward the city of San Francisco by allowing views around YBI, because of their northerly and southerly locations, respectively, in comparison with the existing East Span. Replacement Alternative N-2 would expand views to a lesser degree, because it would closely follow the alignment of the existing East Span.

4.3.3 Impacts on Views to the Bridge

The changes in visual quality due to the project alternatives have been analyzed from 20 viewpoints around the Bay Area, as described in Section 3.3.3 — Viewer Groups and Viewpoints. Generally, the changes that would occur with each of the various project alternatives and design variations would be similar from each of the viewpoints. The analysis from five viewpoints has been included in the FEIS to represent the changes in visual quality from each location. These viewpoints are Richmond (from the north), the Oakland Touchdown area (from the east), the Oakland-San Francisco Ferry (from the south), TI (from the west), and the Nimitz House on YBI. This analysis included computer-generated visual simulations.

Impact of Build Alternatives

The retrofit alternative would have a negligible impact on visual quality from distant viewpoints, because the structural elements added to the East Span would not be perceptible. For some of the closer viewpoints, the retrofit alternative would have a minimally adverse impact on viewers, as the additional structural elements (new columns and strengthening of existing columns) would obstruct views underneath the bridge.

The main span design variations (self-anchored suspension [preferred design variation] and cable-stayed) would result in the most favorable impact upon visual quality regardless of the viewpoint location. Typically, this is due to the increase in the vividness of the span. Also, overall unity would occur with the self-anchored suspension main span. While conditions would vary at individual viewpoints, overall the three replacement alternatives (N-2, N-6 [Preferred], and S-4) would result in virtually identical visual impacts.

The skyway design variation would result in the greatest reduction in visual quality. Typically, this impact would be due to a reduction in the vividness and intactness of the span caused by the simpler structure and thinner bridge deck. While conditions would vary at individual viewpoints, overall the alignments of the three replacement alternatives under the skyway design variation would result in virtually identical visual impacts.

Analysis from Representative Viewpoints

Richmond Marina.

Retrofit Existing Structure Alternative. The retrofit alternative would have a negligible impact on visual quality. The long distance from this viewpoint to the East Span would make changes to the columns and support structures imperceptible.

Skyway Design Variation. The skyway design variation would have a minimally adverse impact on visual quality, due to its reduction in vividness (see Figure 4-4 in Appendix A). While it would remain at a favorable viewing angle, the simplicity of the structure would eliminate the striking and distinctive nature of the existing East Span.

Main Span Design Variations. The self-anchored suspension (preferred design variation) and cable-stayed design variations would have a minimally beneficial impact on the visual quality of the view towards the East Span. The main span tower would add landmark strength and distinctiveness, but the distance between the viewpoint and the East Span would make its distinct elements difficult to discern.

The self-anchored suspension (preferred design variation) and cable-stayed design variations would have a beneficial impact on the overall visual quality from the Richmond Marina, due to the increase in the vividness of the East Span and overall unity of the view (see Figure 4-5 in Appendix A). Unity would increase the greatest amount (from moderate-to-high to high) for the self-anchored suspension main span, due to the visual similarity, prominence, and shape compared with the SFOBB West Span (which is visible from the vantage point). Unity would increase less (remaining at moderate-to-high) with the cable-stayed main span, because its shape would not echo the cable forms of the SFOBB West Span.

Oakland Touchdown Area.

Retrofit Existing Structure Alternative. The retrofit alternative would result in a minimally adverse impact on visual quality of the view toward the East Span, due to the increase in view obstruction. New support columns and other structural elements added as part of the retrofit alternative would decrease views beneath the East Span.

Skyway Design Variation. The skyway design variation would result in a minimally adverse impact on visual quality, due to the slight decrease in the vividness of the East Span (although the East Span's close proximity and prominence mean vividness would still remain high) (see Figure 4-6 in Appendix A). In addition, with Replacement Alternatives N-2 and N-6 (Preferred), there would be a slight increase in view obstruction. These alternatives would provide views similar to the existing East Span, although its more gradual rise from east to west would obstruct views from beneath the East Span to the north.

Main Span Design Variations. The self-anchored suspension (preferred design variation) and cable-stayed design variations would result in a minimally beneficial impact on visual quality of the view toward the East Span, due to the increase in vividness and unity and the fact that the East Span occupies much of the larger view

(see Figure 4-7 in Appendix A). The main span tower would add landmark strength and distinctiveness. Vividness would increase the most with Replacement Alternatives N-6 (Preferred) and S-4, because the main span tower would be at a more favorable viewing angle (closer to 45 degrees) than Replacement Alternative N-2.

Unity would increase most with Replacement Alternatives N-2 and N-6 (Preferred), though the overall impact is slightly lessened by the high visibility, from this viewpoint, of approximately 30 support columns on YBI. Compared to Replacement Alternatives N-2 and N-6, Replacement Alternative S-4 would produce less of an increase in unity because portions of the SFOBB West Span would be visually obstructed. With all replacement alternatives, unity would increase more with the self-anchored suspension main span, due to the visual similarity, prominence, and shape compared with the SFOBB West Span and Golden Gate Bridge (which are visible from the vantage point). Unity would increase less with the cable-stayed main span, because its shape does not echo the cable forms of the SFOBB West Span.

Oakland-San Francisco Ferry.

Retrofit Existing Structure Alternative. The retrofit alternative would result in a negligible impact on visual quality. New support columns and other structural elements added as part of the retrofit alternative would decrease views beneath the East Span. However, views beneath the East Span would be constantly changing as the ferry travels across the Bay, thereby minimizing the view obstruction created by the new columns and structural elements.

Skyway Design Variation. The skyway design variation would result in a minimally adverse impact on visual quality, due to the decrease in its vividness (see Figure 4-8 in Appendix A). While it would remain at a favorable viewing angle and would be relatively close, the simplicity of the skyway design variation would reduce the distinctive nature of the existing East Span. The reduction in the vividness would be less perceptible with Replacement Alternative S-4, because it is the closest replacement alternative to this viewpoint. Vividness would reduce the most with Replacement Alternative N-6 (Preferred).

Main Span Design Variations. The self-anchored suspension (preferred design variation) and cable-stayed design variations would result in a minimally beneficial impact on the visual quality of the view toward the East Span, due to the increase in its vividness (see Figure 4-9 in Appendix A). The main span would add landmark strength and distinctiveness to the East Span. When comparing replacement alternatives, vividness would be most increased with Replacement Alternative S-4, because it is nearest to this viewpoint.

The self-anchored suspension (preferred design variation) and cable-stayed design variations would result in a minimally beneficial impact on the overall visual quality of the view toward the East Span, due to the increase in its unity and vividness. The close proximity and visual dominance of the East Span mean that changes to it would substantially affect the overall visual quality of the larger view. Unity would increase more with the self-anchored suspension main span, due to the visual similarity,

prominence, and shape compared with the SFOBB West Span (which is visible from this viewpoint). With the cable-stayed main span, unity would increase over existing conditions but less than with the self-anchored suspension main span, because its shape does not echo the catenary forms of the SFOBB West Span.

Treasure Island – Viewpoint 1.

Treasure Island - Viewpoint 1 is located on the south end of TI at Clipper Cove looking east at the main portion of the East Span.

Retrofit Existing Structure Alternative. The retrofit alternative would result in a minimally adverse impact on visual quality. This impact is due to the increase in view obstruction from the addition of shear walls on support structures under the bridge toward the city and Port of Oakland (see Figure 4-10 in Appendix A).

Skyway Design Variation. The skyway design variation would result in a minimally adverse impact on the visual quality of the view toward the East Span (see Figures 4-11 and 4-12 in Appendix A). With Replacement Alternative N-6 (Preferred), this decrease would be due to reduced vividness (these impacts are somewhat offset by improved views over the East Span). With Replacement Alternative N-2, the reduction in visual quality would be due to the reduced vividness. With Replacement Alternative S-4, any reduction in visual quality would be due to reduced vividness and additional view obstruction caused by the way the columns would align.

The skyway design variations would result in a minimally adverse impact on the overall visual quality from TI. The close proximity and visual dominance of the East Span within the larger view mean that changes to it would substantially affect the overall visual quality. The reasons for the reduction in overall visual quality are the same as those cited in the preceding paragraph.

Main Span Design Variations. The self-anchored suspension (preferred design variation) and cable-stayed design variations would result in a minimally beneficial impact on the visual quality of the view toward the East Span (see Figures 4-13 and 4-14 in Appendix A). With Replacement Alternative N-6 (Preferred), this impact would be due to the increase in the vividness of the East Span because of the closer proximity of the bridge and its tower and cable systems. In addition, views of the East Bay under the bridge would be less obstructed. With Replacement Alternative N-2, there would be an increase in vividness as with Replacement Alternative N-6. However, Replacement Alternative N-2 would cause view obstruction similar to that of the existing East Span. With Replacement Alternative S-4, vividness would increase over the existing East Span, but would be less than with Replacement Alternatives N-6 and N-2, due to the poor viewing angle and increased distance to the tower and cable systems. Blockage of views to the East Bay under the bridge would be worse with Replacement Alternative S-4 when compared to the existing bridge and Replacement Alternatives N-6 and N-2.

Treasure Island – Viewpoint 2.

Treasure Island – Viewpoint 2 is located generally in the same location as Treasure Island – Viewpoint 1, but further to the east and looking south as opposed to east.

This viewpoint was added to the visual analysis in response to agency comments on the Draft EIS. As a result, this viewpoint is discussed in this FEIS, but not included in the Visual Impact Assessment technical report.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would result in a minimally adverse impact on visual quality. This impact is due to the increase in view obstruction from addition of shear walls on support structures under the bridge (see Figure 4-17a in Appendix A).

Skyway and Main Span Design Variations. The skyway and main span design variations would result in similar negligible to minimally adverse impacts on visual quality of the view toward the East Span (see Figures 4-17b and 4-17c in Appendix A). The tower and cable structures associated with the main span design variations are not visible because they are just to the east of this view. With Replacement Alternative N-6 (Preferred), there would be a negligible impact on visual quality because a similar number of columns would be visible when compared to the existing East Span. In addition, Replacement Alternative N-6 roadway decks would have a similar appearance as the existing East Span's double-decks because the side-by-side decks of the Replacement Alternatives would be separating in elevation to allow transition into the double-deck Yerba Buena tunnel.

Replacement Alternatives N-2 and S-4 would result in minimally adverse impacts on visual quality because of the additional support columns required on the island to support the side-by-side roadway decks. These columns would create additional blockage of views under the bridge when compared to the existing East Span. This adverse impact is somewhat offset by the reduced depth of the roadway deck that is provided by the side-by-side configuration of the Replacement Alternatives.

Nimitz House, Yerba Buena Island.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would result in an adverse impact on the visual quality of the view toward the East Span, due to the increase in view obstruction and shadows caused by the reinforcement of the existing columns (see Figure 4-15a in Appendix A).

Skyway Design Variation. The skyway design variation would result in a range of impacts from negligible to minimally adverse on the overall visual quality of the view toward the East Span, depending upon the replacement alternative. With Replacement Alternatives N-2 and N-6 (Preferred), there would be a minimally adverse impact, due to the increase in the number and thickness of the visible columns beneath the span. Nimitz House users would likely notice a tangible change and minimal reduction in the visual quality of this view. With Replacement Alternative S-4, there would be a negligible impact, as the increase in the intactness of the East Span (more of the length

of the East Span would be visible) would be offset by the increase in view obstruction caused by the increase in the number and thickness of the visible columns beneath the span. However, the columns would be farther away as compared to the northern replacement alternatives. This would open up the immediate foreground.

Main Span Design Variations. The self-anchored suspension (preferred design variation) and cable-stayed design variations would result in a negligible impact on the visual quality of the view toward the East Span (see Figures 4-15b and 4-15c in Appendix A). For all replacement alternatives, there is a negligible impact, because the increase in the intactness of the East Span (more of the length and/or the main span tower of the East Span would be visible) would be offset by an increase in view obstruction (due to the increase in the number and thickness of the visible columns beneath the span).

Yerba Buena Island.

This viewpoint was added to the visual analysis in response to agency comments on the Draft EIS. As a result, this viewpoint is discussed in this FEIS, but not included in the Visual Impact Assessment technical report.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would result in an adverse impact on visual quality. This impact is due to the increase in view obstruction from addition of shear walls on support structures under the bridge (see Figure 4-16a in Appendix A). The addition of the shear walls would reduce views of vegetation on the hills of Yerba Buena Island. However, the vividness and intactness of the bridge would remain relatively unchanged.

Skyway and Main Span Design Variations. Both the skyway and main span design variations would result in similar impacts on visual quality from this viewpoint because the tower and cable structures associated with the main span design variations are not visible from this viewpoint (see Figures 4-16b and 4-16c in Appendix A).

Replacement Alternative N-6 (Preferred) would result in a minimally adverse impact on visual quality. This replacement alternative would result in additional support columns being constructed on Yerba Buena Island. From this viewpoint, these columns would visually line up to create additional blockage of views of vegetation on the hills of Yerba Buena Island. Vividness of the bridge would increase with Replacement Alternative N-6 because the bridge would move closer to this viewpoint, providing a more dramatic sense of the scale of the bridge in relationship to the island and the Nimitz House. There would be a negligible change in intactness of this view because the basic elements of this view (the bridge, Nimitz House, trees and dense vegetation of Yerba Buena Island) would not be substantially changed.

Replacement Alternatives N-2 and S-4 would also result in minimally adverse impacts on visual quality, with Replacement Alternative S-4 resulting in the least adverse impact because of its more southerly location. The reduction in visual quality is primarily due to the number of columns that would be constructed on Yerba Buena Island and the

view blockage they would create. As indicated above, the intactness of this view would not change substantially with any of the replacement alternatives. Replacement Alternative S-4 would result in a slight reduction in vividness because it would be the furthest alignment from this viewpoint. While Replacement Alternative N-2 would result in a slight increase in vividness compared to the existing East Span, but somewhat less than Replacement Alternative N-6.

4.3.4 Impacts Due to the Removal of Vegetation and Slope Disturbance on Yerba Buena Island and at the Oakland Touchdown Area

Impacts

All build alternatives would require the removal of woodland vegetation. The Retrofit Existing Structure Alternative would require the removal of 150 trees, while the three replacement alternatives would require the removal of approximately 325 to 350 trees from 15 centimeters to 1.8 meters (6 inches to 6 feet) in diameter within the project's construction limits on YBI. The trees that would be removed would be within the Caltrans temporary construction easement on Navy-owned land. A large grove of mature trees, primarily eucalyptus, would be removed from the east-facing slopes of the island to accommodate any of the proposed replacement alternatives and associated temporary detours. The average height of the trees is 12 meters (39 feet). The visual impact of the existing trees is dramatic, since they soften the island's appearance from a distance and screen a number of residences on the island from the bridge. Since the current tree density on YBI constitutes a high fuel load for potential fires, the San Francisco Fire Department has proposed tree thinning on YBI to decrease the risk of fire.

The Retrofit Existing Structure Alternative would result in no vegetation loss at the Oakland Touchdown area because the area was already cleared as part of interim seismic retrofit work that occurred in 1998. All three replacement alternatives would require the removal of a number of trees within the project's construction limit on the Oakland Touchdown area. Replacement Alternatives N-6 (Preferred) and N-2 would necessitate the removal of 71 mature pine trees. Replacement Alternative S-4 would necessitate the removal of 12 mature pine trees.

The removal of this vegetation on both YBI and the Oakland Touchdown area would constitute a substantial adverse visual impact, and approximately 10 to 20 years would be required before the vegetation could reestablish itself to the density that exists today. The loss of this many trees would be highly noticeable during the construction period and subsequent years until the vegetation has reestablished itself. Views from the bridge, from the East Bay, and views westward from the eastern end of YBI would be affected by the removal of this vegetation. Table 4.3-1 includes the amount of total area disturbed and number of trees removed by alternative.

Table 4.3-1 Tree Removal Estimates

	Total Area Disturbed	Maximum Number of Trees Removed
Yerba Buena Island		
Alternative N-2	9.4 hectares/23.2 acres	350
Alternative N-6 (Preferred)	10.3 hectares/25.5 acres	350
Alternative S-4	9.4 hectares/23.2 acres	325
Retrofit	5.2 hectares/12.8 acres	150
Oakland Touchdown Area		
Alternative N-2	3.8 hectares/9.4 acres	71
Alternative N-6 (Preferred)	3.8 hectares/9.4 acres	71
Alternative S-4	5.5 hectares/13.6 acres	12
Retrofit	None	0

Source: Caltrans, August 1998.

The hillside on YBI to the south of the East Span is extremely steep and, though its steepness would restrict the amount of construction activity which would take place on it, some access would be necessary to construct temporary and permanent columns on and near it. The appearance of this slope may be permanently altered as a result of construction efforts. Returning the slope to its original grade may be difficult due to the underlying soil and geology and the steepness of the slope.

Mitigation:

Yerba Buena Island

Caltrans would develop construction limits that minimize impacts to YBI by preserving selected vegetation and maintaining some screening of structures on the island to the maximum extent possible. Specifically, special consideration would be given to preserving the two mature coast live oak trees behind Quarters 1 and all or part of the vegetation which currently screens Quarters 1 from the existing bridge. In addition, the contractor would be required to submit an access plan that would be approved by Caltrans before work on the island is begun. The plan would detail construction activities such as grading of slopes, placement of access roads, removal of vegetation, and locations of platforms needed for large equipment. Caltrans would use this construction access information to ensure that key vegetation is preserved to the maximum extent possible and to aid in tailoring a revegetation plan to pre-construction site conditions. Caltrans would then develop and implement a revegetation plan designed to reestablish vegetation in affected areas, including the planting of mature trees, monitoring, and replanting as necessary to return disturbed areas to a natural appearance and to establish visual screening of the bridge comparable to the existing condition to the maximum extent feasible. This planting plan would be developed in coordination with local agencies and implemented within two years after the bridge construction is completed. Some planting in sensitive areas may be replaced as part of the bridge construction contract.

The contractor would be required to protect the stability of the slope in areas of construction for structure footings positioned on hillside areas. Sheet pile shoring would be used to back the excavated slope and cement-modified soil backfill or other retention systems that would be conducive to revegetation would be used to stabilize the temporary detour foundations. Permanent soil stability measures such as walls and planting would be developed as part of the final design of a replacement alternative.

Oakland Touchdown Area

Mitigation for visual impacts would include development of a master planting plan in coordination with affected local agencies, including the City of Oakland, Port of Oakland, BCDC, and East Bay Regional Park District (EBRPD). The planting plan would be implemented within two years after bridge construction is completed. The Caltrans master replanting plan for the Oakland Touchdown area will be coordinated with the park design being led by the EBRPD. Replanting may take place simultaneously with the construction of the park.

4.4 AIR QUALITY

All the proposed alternatives would maintain five lanes of traffic in both directions on the East Span during and after construction and would not affect traffic volumes on or capacity of the bridge and adjacent freeways. As such, there should not be any change in air pollutant emissions from bridge traffic due to any of the proposed alternatives compared to a No-Build condition. In addition, air quality analyses are typically not required for safety projects such as the East Span Project because the Federal Transportation Conformity Rule exempts safety projects from having to include emission analyses.

However, a possible air quality issue does arise with the replacement alternatives, each of which includes a bicycle/pedestrian path. Users of a bicycle/pedestrian path would be located adjacent to the bridge roadway. A microscale carbon monoxide (CO) analysis was conducted to ensure that sufficient consideration was given to the preservation of air quality along areas of the bridge that might be used for a bicycle/pedestrian path.

This section considers the potential for exceeding state and federal ambient air quality standards for CO along the proposed bicycle/pedestrian path due to project operations. Short-term air quality impacts during construction are discussed in Section 4.14 — Temporary Impacts During Construction Activities.

4.4.1 Methodology

A microscale dispersion analysis of CO emissions was performed using the EMFAC7F emission factor model[5] and CALINE4 dispersion model[6]. Traffic along a typical replacement structure was modeled under year 2005 conditions to determine CO concentrations 5.5 meters (18 feet) from the outside edge of the travel lanes, representing the center of a bicycle/pedestrian path. There would be no other public receptors in the immediate vicinity of the bridge span.

Background concentrations for the year 2005 were determined to be 1.9 parts per million (ppm) for one-hour average and 1.3 ppm for eight-hour average. These background concentrations were determined using Bay Area Air Quality Management District (BAAQMD) isopleth maps and rollback factors[7]. Isopleth maps are maps that show contour lines of CO concentration. The contours are based on monitoring data and can be used to interpolate concentrations where there are no monitoring stations. Rollback factors are used to reduce current CO background levels as an estimate of

[5] A computer model developed by the California Air Resources Board to estimate composite on-road motor vehicle emission factors by vehicle class.
[6] A model developed by Caltrans that calculates carbon monoxide concentrations from motor vehicle uses.
[7] Bay Area Air Quality Management District, *BAAQMD CEQA Guidelines - Assessing the Air Quality Impacts of Projects and Plans*, April 1996.

future levels. It is assumed that CO levels will decline in the future because newer motor vehicles will presumably have better emission controls.

4.4.2 Impacts

Worst-case one-hour and eight-hour average CO concentrations (project roadway contribution plus background concentration) predicted by the CALINE4 model for the bicycle/pedestrian path are 2.7 ppm for a one-hour average and 1.9 ppm for an eight-hour average. These values are well below the federal and state standards. Federal one-hour and eight-hour standards are 35 ppm and 9 ppm, respectively. State standards are 20 ppm for one hour or 9 ppm for eight hours. In conclusion, neither state nor federal CO standards would be exceeded on the bicycle/pedestrian path regardless of location.

4.4.3 Air Quality Conformity

Air quality conformity evaluations for federal transportation projects and regionally significant non-federal projects are conducted pursuant to the Federal Clean Air Act Transportation Conformity Rule. A federal transportation project is defined as any highway or transit project which is proposed to receive funding assistance and approval through the Federal-Aid Highway Program or the Federal Mass Transit Program, or requires Federal Highway Administration (FHWA) or Federal Transit Administration (FTA) approval for some aspect of the project. The East Span Project is federally approved and will use federal funds (see Section 2.4.1 — Comparison of Alternatives Characteristics, Funding). As a result, the East Span Project must meet the transportation conformity requirements described in Section 3.4.1 — Air Quality, Regulatory Context of this FEIS. The East Span Project is included in the currently conforming Metropolitan Transportation Commission's (MTC) 1998 Regional Transportation Plan (RTP) approved on January 21, 1999 and the 2000/01 Federal Statewide Transportation Improvement Program (FSTIP), which includes as a component the TIP developed by MTC for the Bay Area. MTC's TIP was jointly approved on October 5, 2000 by FHWA and FTA. The design concept and scope of the proposed project have not changed since inclusion into these documents and do not interfere with the timely implementation of transportation control measures in the applicable State Implementation Plan (SIP).

Projects located in federal CO non-attainment or maintenance areas are subject to a project-level CO analysis under the federal Transportation Conformity Rule. The analysis must show that a project's build alternatives would not cause exceedances of federal CO standards. Additionally, in non-attainment areas, the project cannot generate CO emissions that would worsen existing violations or delay timely attainment of CO standards.

A microscale CO analysis was conducted, following guidance provided in the Transportation Project-Level Carbon Monoxide Protocol developed by Caltrans and the Institute of Transportation Studies at the University of California, Davis, for the project to determine project level conformity to the SIP as required by the Environmental

Protection Agency's Transportation Conformity Rule. The analysis assumptions were developed in coordination with MTC and are consistent with assumptions used in the regional emissions analysis for the RTP and TIP for those inputs required in both analyses. The analysis shows that there are no CO violations expected in the project area. Since the Bay Area is not considered a federal PM_{10} non-attainment area, PM_{10} conformity requirements in the Transportation Conformity Rule are not applicable.

Based on the above information, it is concluded that the East Span Project is in conformity with the SIP. This air quality conformity determination is in accordance with the provisions of 40 Code of Federal Regulations (CFR) Parts 51 and 93.

4.5 NOISE AND VIBRATION

Traffic noise impacts have been analyzed and are presented in this section. Traffic noise impacts are addressed using FHWA Noise Abatement Criteria (NAC) as defined in 23 CFR 772 and Caltrans approved noise policies.

4.5.1 Noise Levels on Yerba Buena Island, Treasure Island, and Oakland Touchdown Area

The noise impact analysis involved modeling for future predicted noise levels for the five alternatives (No-Build, Retrofit Existing Structure, and the N-2, N-6 (Preferred), and S-4 Replacement Alternatives). Potential impacts have been assessed for each alternative for noise-sensitive uses on Yerba Buena Island (YBI), Treasure Island (TI), and the Oakland Touchdown area. The modeled peak-noise-hour levels are shown in Table 4.5-1. A detailed noise impact assessment technical report has been prepared and is available for review at locations listed in the Preface.

In general, future predicted peak-noise-hour levels resulting from Replacement Alternatives N-2, N-6, and S-4 decrease by 1 dBA to 14 dBA compared to the existing condition. The causes of the decrease in modeled noise levels for the future replacement scenarios are:

- Construction of the bridge on YBI and the Oakland Touchdown area, using steel-reinforced concrete, would result in lower operational noise levels by eliminating radiation of sound through the bridge decks;
- Reducing noise created by vehicles traveling over new modular expansion joints[8]; and
- For the replacement alternatives, the eastbound and westbound lanes would be side by side rather than stacked, with the exception of the YBI viaduct and tunnel portal area. This would eliminate traffic noise that may be currently reflecting from the bottom of the upper deck.

Impacts

This section describes expected changes in future noise levels for the project alternatives. Receptor locations are shown on Figures 3-12, 3-13, and 3-14 in Appendix A.

No-Build Alternative and Retrofit Existing Structure Alternative. The No-Build Alternative and the Retrofit Existing Structure Alternative would not result in any increase in traffic capacity, any change in geometry, or any change in traffic speeds. Future predicted noise levels under these alternatives would remain unchanged from existing peak-noise-hour levels. Therefore, no requirement exists for a noise assessment of the No-Build Alternative and the Retrofit Existing Structure Alternative.

[8] Noise modeling assumptions for the replacement alternatives assume that the bridge structures would be constructed of concrete.

Table 4.5-1: Summary of Unabated Peak-noise-hour Levels: Existing and Future Predicted

Location #	Location	Noise Receptor	Modeled Existing Noise Level L_{eq} (dBA)	Future No-Build Noise Level L_{eq} (dBA)	Future Seismic Retrofit Noise Level L_{eq} (dBA)	Future N-2 Noise Level L_{eq} (dBA)	Future N-6 Noise Level L_{eq} (dBA)	Future S-4 Noise Level L_{eq} (dBA)
1	YBI: Houses north of bridge	1A	72	72	72	62	63	63
		1C	70	70	70	63	63	63
		1-LT	71	71	71	61	62	62
		1-M1	74	74	74	64	64	64
		1-M2	70	70	70	62	63	62
		1-M3	69	69	69	62	63	62
		1-M4	70	70	70	62	63	62
		1-M5	75	75	75	64	65	64
2	YBI: Housing north of bridge	2A	74	74	74	73	73	73
		2-M1	71	71	71	70	70	70
3	YBI: House north of bridge	3A	75	75	75	71	71	71
4	YBI: House south of bridge	4A	72	72	72	70	71	70
5	YBI: Houses south of bridge	5A	66	66	66	65	65	65
		5C	64	64	64	63	63	64
		5D	64	64	64	60	60	61
		5-M1	67	67	67	65	65	66
6	YBI: USCG housing south of bridge and below	6A	72	72	72	62	62	62
		6C	71	71	71	61	61	62
		6-M1	72	72	72	62	62	62
		6-M2	72	72	72	61	62	62
7	YBI: USCG administration complex south of bridge and below	7A	69	69	69	60	60	61
		7-M1	71	71	71	61	61	62
9	YBI: Abandoned buildings north of bridge and below	9A	76	76	76	67	67	67
		9-M1	76	76	76	67	67	67
10	YBI: Building 262 north of bridge and below	10A	77	77	77	N/A*	65	65
		10-M1	77	77	77	N/A*	N/A*	66
11	YBI: USCG base outdoor recreation area south of bridge and below	11A	75	75	75	64	64	64
		11C	77	77	77	68	68	N/A*
		11-M1	77	77	77	68	68	N/A*
		11-M2	77	77	77	69	69	69
		11-M3	77	77	77	69	69	N/A*
12	OT: Proposed Park Distr. Shoreline public access area north of bridge	12A	72	72	72	N/A*	N/A*	68
		12-M1	71	71	71	N/A*	N/A*	67
		12-M2	74	74	74	N/A*	N/A*	71
		12-LT	73	73	73	N/A*	N/A*	70
13	OT: Proposed Park Distr. Shoreline public access area south of bridge	13A	73	73	73	67	67	68
		13C	74	74	74	70	70	N/A*
		13-M1	73	73	73	67	67	N/A*
		13-M2	71	71	71	68	68	N/A*
		13-M3	71	71	71	68	68	72
17	OT: Radio Point Beach shoreline access, wildlife habitat north of bridge	17A	66	66	66	69	69	69
		17-M1	70	70	70	73	72	73
18	OT: Shoreline south of bridge	18A	69	69	69	71	70	72
		18-M1	66	66	66	68	68	69
		18-M2	65	65	65	67	67	67
20	YBI: Navy Parade Grounds north of bridge and below	20A	72	72	72	62	62	63
		20-M1	72	72	72	62	62	63
21	YBI: Cleared area north of bridge and below	21A	74	74	74	60	60	62
		21-M1	73	73	73	60	60	62
		21-M2	73	73	73	60	60	62
		21-M3	73	73	73	59	59	61
TI	TI	STUDIO	67	67	67	59	59	58

Note: YBI = Yerba Buena Island; OT = Oakland Touchdown Area; TI = Treasure Island
*** - This alternative would place the bridge above or on top of this location.**

Replacement Alternative N-2. Replacement Alternative N-2 would lie to the north of the existing East Span and transition from the double-deck viaduct to two parallel structures over YBI. Generally, future noise levels would decrease by 1 to 14 decibels compared to the existing, No-Build, and Retrofit Existing Structure Alternatives, resulting in many of the receptors experiencing future predicted noise levels below FHWA NAC. This would eliminate the need for noise abatement at these locations.

Yerba Buena Island. Future predicted peak-noise-hour levels under the Replacement Alternative N-2 at Receptor Locations 1, 6, 7, 20, and 21, (as shown on Figure 3-12) would be 7 to 14 dBA quieter than existing conditions. The future predicted noise levels at Locations 1, 5, 6, 20, and 21 are below the FHWA NAC for Activity Category B land uses (residences, recreation areas, etc.) of 67 dBA L_{eq} under Replacement Alternative N-2. At Location 7, the future predicted peak-noise-hour levels are 60 and 61 dBA L_{eq}, which are below the FHWA NAC of 72 dBA for Activity Category C (commercial land use). The future predicted noise levels at Locations 2, 3, 4, 9, and 11 would approach or exceed the 67 dBA L_{eq} standard and, therefore, there is a noise impact at those locations.

Treasure Island. Future predicted peak-noise-hour noise level at the film studio on TI with Replacement Alternative N-2 is predicted to be 59 dBA L_{eq} (see Figure 3-13 for receptor location), a decrease of 8 dBA compared with the No-Build or Retrofit Existing Structure Alternatives. This level would be below the NAC for Activity Category C (commercial uses) of 72 dBA L_{eq}.

Oakland Touchdown Area. Future noise levels under Replacement Alternative N-2 are predicted to vary from 67 dBA L_{eq} to 73 dBA L_{eq} at the receptor locations shown on Figure 3-14. Two of the 14 modeled receptors for Replacement Alternative N-2 (Receptors 17-M1 and 18-A) in the Oakland Touchdown area have future predicted peak-noise-hour levels which approach or exceed the FHWA NAC for Activity Category C of 72 dBA L_{eq}. While future predicted noise levels at the future Gateway Park would exceed the FHWA NAC of 67 dBA for Activity Category B (residences and recreational areas) and constitute a noise impact, this would occur regardless of any of the East Span build alternatives. The proposed park would be implemented following construction of the East Span Project, and park planning to date includes interagency coordination regarding ways to enhance the relationship of the transportation facility to the proposed park. While future users of the proposed Gateway Park could experience slightly higher noise levels (increases of 2 dBA) in the eastern portion of the park compared to a no-build condition, these increases would not be perceptible. Noise levels at the western end of the park would be 3 to 6 dBA lower than under the No-Build Alternative. To date, park proponents have expressed interest in retaining views rather than attenuating noise. Therefore, the East Span Project does not propose noise attenuation at the Oakland Touchdown area.

Replacement Alternative N-6 (Preferred). Generally, future predicted noise levels resulting from Replacement Alternative N-6 decrease by 1 dBA to 14 dBA

compared to the existing bridge. The lower noise levels are less than the FHWA NAC at many receptors, thus eliminating the need for abatement at these locations.

Yerba Buena Island. As shown in Table 4.5-1, with Replacement Alternative N-6 the future predicted peak-noise-hour levels at Receptor Locations 1, 6, 7, 20, and 21 would be 6 to 14 dBA quieter than existing conditions. The future predicted noise levels at Locations 1, 5, 6, 20, and 21 are below the FHWA NAC for Activity Category B land uses (residences and recreation areas) of 67 dBA L_{eq}. With Replacement Alternative N-6, the future predicted peak-noise-hour levels at Location 7 are 60 and 61 dBA L_{eq}, which are below the FHWA NAC of 72 dBA for this Activity Category C land use (commercial uses). The future predicted noise levels at Locations 2, 3, 4, 9, and 11 would have noise levels which approach or exceed the 67 dBA L_{eq} criteria constituting a noise impact.

Treasure Island. The future predicted peak-noise-hour noise level at the film studio on TI is estimated to be 59 dBA L_{eq}, a decrease of 8 dBA compared with the existing condition. The traffic noise associated with Replacement Alternative N-6 would be below the NAC for Activity Category C (commercial uses) of 72 dBA L_{eq}.

Oakland Touchdown Area. As shown in Table 4.5-1, one of the 14 modeled receptors for Replacement Alternative N-6 (Receptor 17-M1) in the Oakland Touchdown area has future predicted peak-noise-hour levels which exceed the FHWA NAC for Activity Category C (commercial uses) of 72 dBA L_{eq}; therefore, there is a noise impact. While future predicted noise levels at the planned Gateway Park will exceed the FHWA NAC of 67 dBA for Activity Category B (residences and recreation areas) and constitute a noise impact, this will occur regardless of the East Span Project. The proposed park would be implemented following construction of the East Span Project, and the park planning to date includes interagency coordination regarding ways to enhance the relationship of the transportation facility to the proposed park. While future users of the proposed Gateway Park could experience slightly higher noise levels (increases of 1 to 2 dBA) in the eastern portion of the park compared to a no-build condition, these increases would not be perceptible. Noise levels at the western end of the park would be 3 to 6 dBA lower than under the No-Build Alternative. To date, park proponents have expressed interest in retaining views rather than attenuating noise. Therefore, the East Span Project does not propose noise attenuation at the Oakland Touchdown area.

Replacement Alternative S-4. Future predicted noise levels resulting from Replacement Alternative S-4 would be similar to those from Replacement Alternatives N-2 and N-6, differing by less than one to two decibels. Generally, future predicted noise levels resulting from Replacement Alternative S-4 decrease by 1 dBA to 12 dBA compared to the existing condition. The noise level decreases associated with this alternative cause many of the receptors to be below the FHWA NAC.

Yerba Buena Island. As shown in Table 4.5-1, the future predicted peak-noise-hour levels at Receptor Locations 1, 6, 7, 20, and 21 would be 7 to 12 dBA quieter than existing conditions. The future predicted noise levels at Locations 1, 5, 6, 9, 20, and 21 meet the FHWA NAC for Activity Category B land uses (residences and recreation

areas) of 67 dBA L_{eq} under Replacement Alternative S-4. At Location 7, the future predicted peak-noise-hour levels would be 61 dBA L_{eq}, which is below the FHWA NAC of 72 dBA for Activity Category C (commercial uses). The future predicted noise levels at Locations 2, 3, 4, 9, and 11 would have noise levels which approach or exceed the 67 dBA L_{eq} criteria constituting a noise impact.

Treasure Island. The future predicted peak-noise-hour level at the film studio on TI is estimated to be 58 dBA L_{eq}, a decrease of 9 dBA compared to the existing condition. As with Alternatives N-2 and N-6, the traffic noise associated with Replacement Alternative S-4 would be below the NAC for Activity Category C (commercial uses), which is 72 dBA L_{eq}.

Oakland Touchdown Area. Four of the 14 modeled receptors in the Oakland Touchdown area (Receptors 12-M2, 13-M3, 17-M1, and 18-A) have future predicted peak-noise-hour levels which approach or exceed the FHWA NAC for Activity Category C (commercial uses) of 72 dBA L_{eq} under this alternative; therefore, there is a noise impact. While future users of the proposed Gateway Park could experience slightly higher noise levels (increases of 2 to 3 dBA) in the eastern portion of the park compared to a no-build condition, these increases would not be perceptible. Noise levels at the western end of the park cannot be quantified using the noise model because the bridge would be directly over the area, but the bridge deck itself would likely shield the area from traffic noise on the structure above. Mitigation for locations within the Oakland Touchdown area that approach or exceed NAC are not being proposed as park proponents have expressed interest in retaining views rather than attenuating noise.

Abatement

FHWA requires consideration of noise abatement (e.g., construction of a noise barrier such as a masonry wall or earthen berm) to attenuate noise when the future predicted peak-noise-hour levels approach or exceed FHWA NAC for appropriate land use categories as described in Section 3.5.3 — Noise Abatement Criteria and Analysis Guidelines. Factors to consider in evaluating noise abatement include effectiveness, cost, visual quality, and public acceptance. For the East Span Project, in which the travel lanes are on a bridge structure, such measures as earthen berms would not be possible. Buffer zones or acquiring additional right-of-way to avoid impacts are not feasible as adjacent land owners (such as the USCG) cannot be easily relocated. Abatement measures in the form of noise barriers along the roadway where it touches on YBI were evaluated in the Noise and Vibration Study for the project (a summary is presented in Appendix P and figures showing possible barrier locations are presented in Appendix A as Figures 4-18 through 4-20).

The sound walls evaluated as part of the noise analysis would not meet current FHWA-approved cost-effectiveness criteria. There are few noise-sensitive locations, and the walls would need to be very long to protect those locations, resulting in a high cost per benefited location.

In addition, the presence of sound walls would conflict with maintaining the aesthetics of the proposed bridge design and views to and from the bridge. Sound walls in which

the upper portion of the walls would have see-through panels were considered, but they were rejected for several reasons. Most importantly, Caltrans does not permit the use of see-through panels adjacent to high-speed, high-volume freeways because they have not been crash-tested. Until such testing has been done and this safety concern has been successfully resolved, see-through panels are not permitted adjacent to state highways. See-through panels would have to be cleaned on a periodic basis and would require replacement due to breakage and impacts from fog, salt water, high humidity, and ultraviolet radiation. Even with the use of see-through panels, the visual impact would still remain for viewers of the bridge and for users of the bridge.

During the public involvement process for this project, no public comments were received requesting soundwalls. Proponents of the Gateway Park have expressed interest in retaining views rather than attenuating noise.

Based on the above discussion, it has been determined that noise abatement would not be constructed as part of a replacement bridge.

4.5.2 Noise on the Bicycle/Pedestrian Path

All replacement alternatives would include a bicycle/pedestrian path along the south side of the eastbound structure. To assess future predicted noise levels on the bicycle/pedestrian path, Caltrans performed a noise study of the existing bike path adjacent to Route 24 between Orinda and Lafayette in Contra Costa County. Noise readings of 82 dBA L_{eq} were measured from the center of the bike path, a distance of 7.5 meters (24 feet), to the center of the nearest freeway lane during off-peak traffic (10:30 a.m. – 11:30 a.m.). Traffic counts were conducted and average speeds were determined. The results were then adjusted to reflect peak-period traffic on the bridge, a noisier condition. No profile grade adjustments were made. Route 24 has a profile grade of three percent, while the proposed new East Span would have a profile of less than two percent. Not adjusting for profile grade results in a conservative estimate, because a steeper grade contributes to higher noise levels from trucks.

The conclusion of the noise study was that future predicted noise on the bicycle/pedestrian path on a new East Span would be approximately 0-2 dBA higher than the Route 24 bike path, or 82-84 dBA, during the noisiest hour of the day.

The future predicted noise levels on the path are typical of those in a busy restaurant or in the kitchen with a garbage disposal running and requires shouting to be heard at 1 meter (3.3 feet); most people would perceive the noise as being loud. Two cyclists riding single-file would have difficulty communicating by shouting. The U.S. Occupational Safety & Health Administration (OSHA) has established a health-based criteria of exposure for eight hours to noise levels of 90 dBA. This level was selected to prevent hearing damage in most individuals who are subjected to the noise level for a 40-hour work week over ten years. Because noise levels on the bridge would be lower than the OSHA standard and people would be subjected to it for a period much shorter than the eight-hour period assumed for the standard, exposure to typical noise levels on the bridge would not cause hearing problems.

Other potential noise concerns for path users include the potential to be startled by short-duration loud noises. In a relatively quiet environment where cyclists and pedestrians are not expecting loud traffic noise (such as a truck passing by), these noise levels could startle an individual, resulting in possible loss of balance or control of a bicycle. Because bridge riders would experience steady elevated noise levels and trucks frequently passing by, this is not anticipated to be a substantial safety concern to bridge riders.

Since bridge path users would not experience noise levels significantly different from what users of other Bay Area bike paths adjacent to freeways would experience, Caltrans does not propose noise attenuation measures for the bicycle/pedestrian path.

4.5.3 Vibration

As noted in the affected environment section, existing vibration levels from traffic operations (i.e., heavy-truck traffic) would probably be below the levels of human perception at distances of more than 30 meters (100 feet) from the bridge support columns where ground-borne measurements were performed. Vibration levels from future bridge operations at nearby locations, including the film studios on TI, are predicted to remain below perception and criterion levels for all of the project alternatives and would be lower for the replacement bridge alternatives than for the retrofit alternative. The replacement alternatives would create less groundborne vibration compared to the existing structure due to the higher mass associated with their steel-reinforced concrete construction. There are other sources of vibrations more likely to affect operations at the film studios than bridge traffic. Possible sources include someone walking in the studio, loud music, wave action from the Bay, and wind. Construction-related vibrations from the East Span Project are discussed in Section 4.14.5 — Construction-period Noise and Vibration.

4.6 HAZARDOUS WASTES

Hazardous and contaminated materials have the potential to adversely affect human health and the environment. The design, construction, and operation of the East Span Project would incorporate design elements and construction and operation techniques to minimize these potential adverse impacts.

Caltrans will work with all potentially responsible parties and all responsible regulatory agencies to ensure that hazardous wastes the project disturbs are appropriately managed and remediated, if necessary. Additionally, the Navy has identified certain hazardous waste sites in portions of the area previously under its ownership, and if the Navy requires access from Caltrans to investigate and/or remediate such wastes, it is entitled to such access under the provisions of the land transfer.

A Hazardous Wastes Assessment report has been prepared for the East Span Project and is available for review at the locations identified in the Preface.

4.6.1 Summary and Comparison of Alternatives

Table 4.6-1 and the following subsections summarize and compare potential impacts by alternative for the Yerba Buena Island (YBI) and Oakland Touchdown areas. The discussion focuses on potentially contaminated sites discussed in Section 3.6 — Hazardous Wastes and identified on Figures 3-15a and 3-15b in Appendix A.

Yerba Buena Island

No-Build Alternative. There are no new impacts associated with the No-Build Alternative. There would be a continuation of existing conditions; i.e., lead paint continuing to flake off into the ground and into the Bay. Maintenance of the existing bridge would continue to incorporate lead-containment systems during painting.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would likely affect the following sites:

- Installation Remediation (IR) Site 29, East Side Contaminated Bridge Soils - During excavation at the bents and columns, workers may encounter materials contaminated by metals associated with past bridge operations and also by petroleum hydrocarbons;
- IR Site 8, Former Army Point Sludge Disposal Area - Construction traffic could produce airborne dust containing beryllium and lead;
- IR Site 11, Former Landfill – During pile and pile cap excavation, soil and groundwater containing metals and petroleum hydrocarbons may be encountered;

Table 4.6-1 Comparison of Alternatives: Contaminated Sites

	Alternatives				
Impact Sites	**No-Build**	**Retrofit**	**Alt. N-2**	**Alt. N-6**	**Alt S-4**
YBI Sites					
IR Site 11, Former Landfill			✓	✓	✓
IR Site 29, East Side Contaminated Bridge Soils		✓	✓	✓	✓
IR Site 8, Former Army Point Sludge Disposal Area		✓	✓	✓	✓
Fuel Lines, Building 213		✓	✓	✓	✓
Building 270[a] LUST Site			✓	✓	✓
Building 204/208[b] LUST Site			✓	✓	✓
Building 40 LUST Site			✓	✓	✓
IR Site 13, Section E, Storm Water Off-Shore Sediments					✓
SFOBB Structure		✓	✓	✓	✓
East Span					
Bay Sediment		✓	✓	✓	✓
SFOBB Structure		✓	✓	✓	✓
Oakland Touchdown Area					
Bridge footings (eastern approach area)		✓	✓	✓	✓
Army Site #1 (western end of Burma Road)					✓
Caltrans Maintenance Facility and Undeveloped Median Area			✓	✓	
EBMUD Dechlorination Facility					✓
SFOBB Structure		✓	✓	✓	✓

Source: Hazardous Wastes Assessment, September 1998.
Note: [a] Leaking underground storage tank.
[b] Buildings 204 and 208 have been removed.

- Fuel Lines, Building 213 – During pile and pile cap excavation, workers may encounter petroleum-contaminated soils beyond the fuel oil line trenches in this area (See Figure 3-15a in Appendix A); and

- San Francisco-Oakland Bay Bridge (SFOBB) Structure – Past use of lead-based paint and asbestos on the bridge structure would be of concern during bridge retrofitting activities. Asbestos-containing material may be present in bridge appurtenances. Concerns include both those associated with worker health and safety and handling and disposal of contaminated materials.

Inappropriate handling and disposal of asbestos-containing, hazardous, or petroleum-contaminated materials could degrade water quality. Inappropriate discharge of any contaminated groundwater removed from excavations could degrade water quality. Piles constructed through any existing contaminated water-bearing zone into a lower water-bearing zone could create a conduit for migration of any existing contaminants. Exposure to these materials could present potential human health hazards or adverse ecological impacts.

Replacement Alternatives N-2, N-6 (Preferred), and S-4. Construction of any of the three replacement alternatives may affect the following sites:

- IR Site 11, Former Landfill – Contaminated soil and groundwater may be encountered during pile, pile cap, drainage, and utility excavations. Contaminated groundwater may be encountered if construction of the temporary east entrance to the USCG should exceed the depth of 1.6 meters (5.4 feet) to 3.2 meters (10.6 feet) below ground surface. Soil at the landfill is contaminated with metals, polynuclear aromatic hydrocarbons, petroleum hydrocarbons, and dichlorodiphenyltrichloroethane (DDT). Soil gas emitting from the landfill may be an issue during construction of the temporary east entrance;

- IR Site 29, East Side Contaminated Bridge Soils – During removal of existing columns, construction of new columns, and drainage and utility excavations, workers may encounter soils contaminated by metals associated with past bridge maintenance and operations and also by petroleum hydrocarbons;

- IR Site 8, Former Army Point Sludge Disposal Area – Construction traffic could produce airborne dust containing beryllium and lead. Contaminated groundwater may be encountered during pile excavation;

- Fuel Lines, Building 213 – Petroleum hydrocarbon contamination beyond the fuel oil line trenches could affect the soils near the base of the columns in this area (see Figure 3-15a in Appendix A);

- Building 270/Building 40 Leaking Underground Storage Tank (LUST) Site – Construction of a temporary detour or Replacement Alternative S-4 above Buildings 270 and 40 may be affected by elevated concentrations of Total Petroleum Hydrocarbons (TPH)/diesel in soils and groundwater associated with leaking underground storage tanks;

- Building 204/208 LUST Site – Construction of replacement alternatives may affect a possible source of contamination at the Building 204/208 site. It should be noted that Buildings 204 and 208 are no longer on the site. The former fire station/gas station site appears to be located upgradient from Building 270 (referenced above) and may be a possible source of groundwater contamination identified in the groundwater monitoring well immediately upgradient of Building 270;

- SFOBB Structure – Past use of lead-based paint and asbestos on the bridge structure would be of concern during bridge dismantling activities. Asbestos-containing material may be present in bridge appurtenances.

- Buildings 30, 40, 75, 213, and 270 – Construction and maintenance of these buildings may have included the use of asbestos-containing materials and lead-based paint; and

- Lead-contaminated soil adjacent to existing roadways as a result of motor vehicle exhaust.

Replacement alternatives would require more construction activity at these sites than would the Retrofit Existing Structure Alternative. Contamination from IR Site 29 and IR Site 8 is at or very near to the ground surface. Groundwater contamination would also likely be encountered at IR Site 11, Building 270 LUST, Building 40 LUST, and possibly from Site 204/208 LUST and the fuel lines at Building 213.

In addition, Replacement Alternative S-4 would likely affect IR Site 13, Section E, Storm Water Off-Shore Sediments. Off-shore sediments from storm water discharges may have an impact due to columns being constructed within IR Site 13. Contaminants may bind to soil particles carried to the Bay by storm water runoff and deposited in the sediments.

As mentioned for the Retrofit Existing Structure Alternative, inappropriate handling and disposal of contaminated materials could degrade water quality.

Oakland Touchdown Area

No-Build Alternative. There are no new impacts associated with the No-Build Alternative. There would be a continuation of existing conditions; i.e., lead paint continuing to flake off into the ground and into the Bay. Maintenance of the existing bridge would continue to incorporate lead-containment systems during painting.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would likely encounter contamination that was detected around the bridge footings and bents of the eastern approach to the SFOBB. Contaminants of concern include total recoverable petroleum hydrocarbons (TRPH), volatile organic compounds (VOCs), pesticides, polychlorinated biphenyls (PCBs), and metals. The past use of lead-based paint and asbestos on the bridge structure would also be a concern during retrofitting activities. Concerns include both those associated with worker health and safety and handling and disposal of contaminated materials.

Replacement Alternatives N-2 and N-6 (Preferred). Replacement Alternatives N-2 and N-6 would likely encounter soil and groundwater contamination that was detected around the bridge footings and bents of the eastern approach to the SFOBB. Exposure to this source area may be less than for the Retrofit Existing Structure Alternative, because the alignment is shifted north of the existing touchdown area. As such, only the southern edge of Replacement Alternative N-2 should be close enough to the footings to disturb contaminated soil. Materials contaminated with lead from motor vehicle exhaust emissions may be encountered at excavations along the existing freeway shoulders. The past use of lead-based paint and asbestos on the bridge structure would also be a concern during construction and dismantling activities. Asbestos-containing materials may be present in bridge appurtenances.

The proposed realignment of the Caltrans maintenance road under the northern alternatives would impact the undeveloped median area near the Caltrans maintenance facility. During construction, workers may encounter soils contaminated with elevated soluble lead levels.

Replacement Alternative S-4. Replacement Alternative S-4 may affect three sites:

- Army Site #1 (western end of Burma Road) - Construction activities and dismantling of existing structures in the area of this former landfill may pose a risk to workers through direct exposure pathways of known or suspected contaminants, including petroleum hydrocarbons and tetrachloroethene via ingestion, dermal contact, or inhalation;

- East Bay Municipal Utility District (EBMUD) Dechlorination Facility - This facility uses sodium bisulfite. No testing has occurred, but there may be the presence of this compound in the soil. Construction activities may be affected by sodium bisulfite if it is present in the soil. Construction and maintenance of this building may have included the use of asbestos-containing material and lead-based paint; and

- SFOBB Structure - Past use of lead-based paint and asbestos on the bridge structure would be a concern during bridge construction and dismantling activities. Asbestos-containing material may be present in bridge appurtenances.

As mentioned in the YBI discussion, inappropriate handling and disposal of contaminated materials during construction of the build alternatives could degrade the Waters of the State.

Differences in impacts resulting from exposure to these identified contaminant sources would depend on the exact location and nature of proposed construction activities and nature and extent of contamination in these areas.

4.6.2 Further Investigations

This section identifies data gaps and describes the actions necessary to characterize the known and potential contaminant sources that may be affected by the proposed SFOBB East Span Project alternatives.

Yerba Buena Island Data Gaps

The YBI area has been fairly well characterized. Once the National Environmental Policy Act (NEPA) process is complete, a complete and thorough data review would be conducted to identify the status of existing sites and whether any new concerns have been identified. Copies of pending reports from the Navy would be requested. Results of subsurface investigations identified currently as proposed would also be requested. Current analytical data from existing groundwater monitoring wells would also be requested and analyzed.

Oakland Touchdown Area Data Gaps

While the western portion of the touchdown area along the existing East Span has been well studied, reasonable uncertainty about environmental conditions exists in several other areas. Areas needing further investigation include:

- North shore of peninsula along traffic lanes east to SFOBB Toll Plaza: this area is presently undeveloped. Historically, portions of this area were created by artificial fill;

- East of the elevated part of existing bridge approach: this area includes a thin strip of land on both sides of the traffic lanes as far east as the toll plaza. The soil in this area may contain TPH as motor oil, SVOCs, and lead; and

- Area surrounding EBMUD dechlorination tanks: this area may be the source of sodium bisulfite contamination in the soil.

Additional Investigations — All Areas

The following information will be developed during final engineering design:

- Final determination of sites that will be fully or partially acquired; and

- Determination of specific construction activities planned on or near a potential contaminant source.

Once an alternative has been selected and additional available information reviewed, a Phase II Environmental Site Investigation would be conducted for the selected alternative to sufficiently characterize contaminant management and disposal concerns during construction and to identify worker and health and safety issues that will need to be addressed. The Phase II investigation would be scoped to address identified contaminants of concern and would consider proposed construction activities. The Phase II efforts would consider the areas identified above (i.e., data gaps) for which limited data are known. All Phase II investigation efforts would focus on developing specific information about contaminated sites that could affect construction of the

selected alternative and develop hazardous wastes specifications covering handling and disposal procedures for inclusion in the construction bid documents. Phase II investigations would be limited to the level of investigation required to prepare sufficient contractor bid documents (e.g., contaminant management and health and safety procedures). Additional sampling and testing would be required during construction to ensure the proper management of contaminated media encountered.

4.6.3 Mitigation

Mitigation: All Build Alternatives.
Contaminant Management. All excavated waste material would be disposed of in conformance with federal, state, and local laws and regulations. Caltrans will work with all potentially responsible parties and all responsible regulatory agencies to ensure that hazardous wastes are appropriately managed and remediated, if necessary. If additional sampling is required to characterize the material, a sampling plan would be prepared based on guidelines in the Environmental Protection Agency publication SW 846, "Test Methods for Evaluating Solid Waste, Volume II: Field Manual Physical/Chemical Methods." Sampling and analysis would be performed prior to removing the material from the project limits.

Excavated materials that contain lead from vehicle emissions within the ranges specified in the variance granted to Caltrans by the California Department of Toxic Substance Control (DTSC) would be reused in this project or at another site within highway right-of-way along the project corridor. The materials would be placed to minimize leaching into groundwater and erosion due to wind or rain. Materials that cannot be reused in accordance with the variance will be transported to an appropriate disposal facility.

If dewatering is required to construct upland foundations and other appurtenances in areas of contaminated groundwater, the excavation would be hydraulically isolated from the groundwater by using sheet piling, casing, or other methods that would reduce the volume of groundwater discharges. In addition to reducing discharge volumes, isolation of the excavation would prevent cross-contamination of water-bearing zones.

Prior to discharge, groundwater containing contaminants, including suspended solids at concentrations that could cause adverse impacts to water quality, would be treated using the best available and economically feasible technology to reduce the concentrations of the contaminants of concern to acceptable levels in conformance with all federal, state, and local laws and regulations. The treated effluent would be reclaimed for dust control, discharged to a publicly owned treatment facility, or discharged to the Bay. If treatment of the groundwater could not be accomplished on-site, it would be transported to an appropriate off-site treatment facility.

Once the project area has been sufficiently characterized and construction activities sufficiently defined, contract specifications would be developed to address site-specific procedures for contaminant monitoring and identification, temporary storage, handling, treatment, and disposal of materials in accordance with applicable federal,

state, and local laws and regulations. Requirements for coordination with the Navy in its CERCLA responsibilities will be included.

Contingency Planning. In the event hazardous materials are unexpectedly encountered during construction, contract specifications would establish procedures for temporary stoppage of work, securing of the area, notification of the discovery, and proper management of such materials. All procedures would be consistent with Caltrans' guidelines and federal, state, and local laws and regulations and coordinated with responsible parties and regulatory agencies.

Dismantling. Contract specifications for dismantling of all structures, such as the existing SFOBB and Buildings 30, 40, 75, 270, and 213, would include procedures for the abatement, handling, and disposal of lead-based paint and asbestos, as well as the health and safety of workers and nearby residents (including USCG and Navy personnel). Prior to dismantling, asbestos and lead-based paint surveys would be performed to identify these materials. All procedures and permitting requirements would be consistent with Caltrans' guidelines and all federal, state, and local laws and regulations and coordinated with responsible parties and regulatory agencies. The Bay Area Air Quality Management District would be notified per District Regulation 11-2-401.3 – Asbestos Demolition/Renovation.

Workers performing activities on-site that may involve contact with contaminated soil, lead-based paint, asbestos, or groundwater would be required to have appropriate health and safety training in accordance with federal and state regulations. To reduce the risk of exposure, a Worker Health and Safety Plan would be prepared and implemented during construction by a Certified Industrial Hygienist (CIH). The Health and Safety Plan would include provisions for:

- Conducting preliminary site investigations and analysis of potential job hazards;
- Personal protective equipment;
- Safe work practices;
- Site control;
- Exposure monitoring;
- Decontamination procedures; and
- Emergency response actions.

The plan would address reduction of potential worker, Navy and USCG personnel, and public exposure to airborne contaminants by incorporating dust suppression techniques in construction procedures. Procedures would be in place to handle contaminated soils.

4.7 GEOLOGY, SOILS, AND SEISMICITY

This section describes the relationships between project features and expected soil conditions in the project area and also describes issues related to possible seismic events.

4.7.1 Soil and Rock Stability and Settlement

No-Build and Retrofit Existing Structure Alternatives

The No-Build and Retrofit Existing Structure Alternatives would not change area topography and, as such, would not affect slope stability within the project area. Design of the Retrofit Existing Structure Alternative has been based on current soils information, and foundation improvements would reduce the risk of settlement.

Replacement Alternatives N-2, N-6 (Preferred), and S-4

Replacement Alternatives N-2, N-6, and S-4 were developed to respond to the changing geological conditions along the general alignment, including Young Bay Muds, which cover the majority of the Bay bottom between Yerba Buena Island (YBI) and the Oakland Touchdown area. In general, sediments become increasingly thicker eastward from YBI to the Oakland Touchdown area. This means the distance to bedrock is deepest near the Oakland Touchdown, approximately 100 meters (328 feet). Construction of a main span tower is best anchored to bedrock; therefore, placing a new tower as part of a replacement alternative in the eastern portion of the project area is not feasible.

Yerba Buena Island. Initial geotechnical data indicate that several slope stability-related issues could be associated with design of the land and marine tower foundations in the vicinity of YBI. These issues include: the gross stability of the east-facing slope of YBI and the potential for slope failures in the vicinity of the west foundation for the main span.

The slope stability issues have been evaluated through geologic mapping performed on YBI, marine exploration, and laboratory testing of bedrock. Stability analyses for the various potential slope failure modes have been performed. The results show that there is no gross instability at the marine tower foundation, but wedge failures (as described in Section 3.7.3 — Geology and Geotechnical Conditions in the Project Area) are anticipated for the west column foundation on YBI. Rock anchors with or without shotcreted wire mesh and rock bolts are recommended project design features to prevent wedge failures.

There are pre-existing slope stability and erosion problems on parts of YBI in the vicinity of the USCG facility. Both have the potential to interfere with USCG operations. Slope failures and erosion may cause soils and other materials to obstruct the USCG road at the base of the hillside next to the USCG facility.

In addition, the temporary intersection which would be constructed south of the intersection on Treasure Island Road and Southgate Road would require a temporary road through an existing slope approximately 35 meters (115 feet) south of Building

206 and Quarters 8. This intersection would serve traffic exiting the bridge onto YBI on the east side of the island during the time when temporary detours are in use.

Mitigation:

Caltrans would ensure that the project does not exacerbate pre-existing problems within Caltrans' right-of-way or its temporary construction easements either during or after construction. Consultation with the USCG and collection of information on slope stability prior to and during construction would be conducted.

Caltrans will require the contractor to prepare a conceptual plan for slope stability and erosion control on the hillside above the USCG facility. This plan would include Best Management Practices (BMPs) to reduce impacts from storm water runoff which can cause erosion. Caltrans would solicit comments on the conceptual plan from the USCG. Caltrans would be responsible for implementation of the plan. The conceptual plan would be adjusted and revised during construction based on site conditions identified during construction.

Caltrans would monitor the hillside within the project right-of-way and temporary construction easements to detect ground movements during construction that may be associated with project construction activities. If Caltrans determines that slope stability problems are due to its construction, it would correct the problem. Caltrans would prepare a slope restoration concept using standard practices and techniques and would solicit comments from the USCG after which it would finalize and implement the restoration plan.

In order to minimize the impact to the slope from construction of the temporary road, temporary retaining walls would be used. The ramps would be reconstructed and the excavation required for construction of the wall would be filled in.

Oakland Touchdown Area. The fill material at the end of the Oakland shore from the current ground elevation to between 3 and 5 meters (10 and 16 feet) below mean sea level (MSL) is potentially liquefiable material. The potential for liquefaction exists for the fill that lies beneath the water table. Liquefaction is the loss of strength that can occur in loose, saturated soil during or following seismic shaking. The loss of strength is due to the tendency of loose soils to contract and compress when shaken. In a seismic event, liquefaction can produce a number of ground effects, including lateral spreading, boils, ground lurching, and settlement of the fill material. In the case of the Oakland Touchdown, damage would most likely consist of small earth slumps, differential settlement, and cracking of fill embankments. Such damage could be quickly repaired. Pile-supported structures on the Oakland Touchdown would be subject to impacts from liquefaction, such as induced loads, but these structures are designed to accommodate these impacts and would meet lifeline criteria.

To compensate for potential settlement at the Oakland Touchdown area, at-grade approach structures would be created by placing embankment fill on certain sections of the landfall that may be prone to settlement due to consolidation of the soft clay and partially in the Bay to further support approach structures.

The westbound fill design includes the following components to address soil settlement issues:

- Improvement of the existing hydraulically placed sand fill by installation of vertical pipe drains;
- Installation of wick drains to the bottom of the compressible Young Bay Mud layer beneath the new embankment fill to accelerate consolidation settlement and associated shear strength gain;
- Staged placement of embankment fill with geotechnical monitoring to maintain slope stability; and
- Replacement of portions of the embankment fill or existing fill with lightweight cellular concrete fill.

The eastbound and maintenance road fill design takes advantage of the need for relatively low fill heights (4.5 meters [14.8 feet]) and their inland position away from the shoreline. Existing fill would be excavated and replaced to higher grades with lightweight cellular concrete fill.

4.7.2 Seismicity

The project area will likely experience strong to very strong seismically induced ground shaking within the design life of all build alternatives. Under all replacement alternatives, some damage to bridge components would be expected to occur during a major seismic event; however, the components should still be able to substantially perform their design functions. In general, strong ground shaking can cause one or more of the following:

- Densification of loose granular soils;
- Cracking, spreading, and settlement of embankment material;
- Failure of embankments and natural slopes;
- Liquefaction (which can contribute to settlement, slope failure, spreading, and forces on structures); and
- Structural distress to bridges, retaining walls, and culverts.

Surface fault rupture and resulting displacement is not expected since there are no known active faults along the alignments.

No-Build Alternative

Under the No-Build Alternative, the existing East Span would be able to withstand a moderate earthquake. However, it is anticipated that the existing East Span would

experience multiple failures at structure joints and potential collapse into the Bay in the event of a Maximum Credible Earthquake (MCE).

Retrofit Existing Structure

The Retrofit Existing Structure Alternative would provide additional support to the existing East Span compared to the No-Build Alternative. Following retrofit construction, the bridge should be able to withstand an MCE. However, it is anticipated that in the event of an MCE, the retrofitted East Span would experience damage to truss members in the steel superstructure. The addition of new Columns E2A and E2B would eliminate an existing imbalance in the existing main span, which would reduce structural damage. Although the retrofitted main span would be expected to withstand an MCE or smaller event, it is likely that the main span structure (the cantilever section), and potentially other shorter spans, would require extensive repair (possibly requiring closure of the bridge for a six-month to one-year period) or complete replacement of the entire structure, depending on the extent of the damage.

Replacement Alternatives N-2, N-6 (Preferred), and S-4

The replacement alternatives are designed to meet current lifeline seismic safety standards. It is expected that replacement alternatives would withstand an MCE on the San Andreas or Hayward faults. Seismic design criteria for all replacement alternatives are intended to ensure both non-collapse and serviceability of structures when subjected to ground motions during a seismic event.

Potential for damage resulting from an MCE exists. The main span tower structure near YBI would be sited on shallow, sloping bedrock, requiring foundations deep into rock. Damage due to tower settlement in an MCE would most likely be minor and confined to local deflection, cracking, and misalignment of pavement on the main span. Anticipated damage could easily be repaired to permit the East Span to serve a lifeline function.

4.7.3 Tsunamis

The possibility of tsunamis in the Bay Area would most likely be related to a seismic event. Based on U.S. Geological Survey (USGS) map information, it appears that most of the Oakland Touchdown area, which ranges in elevation from about 0 to 3.6 meters (0 to 12 feet) would be subject to inundation from a 200-year-return-period tsunami. At lower return periods (for example, 25 to 100 years), the potential for inundation decreases substantially.

The impacts of a tsunami would be flood damage, erosion, and damage caused by wave and water forces on structures. People, automobiles, and buildings could be washed away as during a flood. Tsunami warnings are a component of the regional emergency warning system and would be implemented in the case of a threat of tsunami inundation.

The structural design of the existing East Span and the replacement structure on the Oakland Touchdown area includes the capability of resisting water/wave/current-induced loading.

4.8 WATER QUALITY

This section discusses potential impacts to water quality in the project area and associated control measures. For each of the replacement alternatives, the water quality impacts and design considerations discussed in this section would be the same.

4.8.1 Surface Water Quality

No-Build Alternative

The No-Build Alternative would not modify current water quality conditions as current methods of operation and maintenance would continue. The current practice of sweeping the bridge decks would continue and storm water would continue to discharge directly into the Bay.

Retrofit Existing Structure Alternative

The Retrofit Existing Structure Alternative may have a temporary water quality impact during construction activities. These activities may include dredging, dewatering, concrete pouring, welding, and other activities that have the potential to impact water quality (see Section 4.14.7 — Temporary Impacts, Water Resources and Water Quality for discussion of construction-related impacts). Potential long-term impacts have also been evaluated, and it has been determined that there are no long-term impacts because the existing facility would not be modified in terms of its operation and drainage system. The current practice of sweeping the bridge decks would continue and storm water would continue to discharge directly into the Bay.

Replacement Alternatives N-2, N-6 (Preferred), and S-4

All replacement alternatives have similar potential to affect water quality in San Francisco Bay, both during and after construction (see Section 4.14 — Temporary Impacts During Construction Activities for discussion of construction-related impacts).

The replacement alternatives would consist of two parallel bridge decks, each accommodating five standard travel lanes and standard shoulders. The overall width of the westbound bridge deck is proposed to be 25 meters (82 feet). The width of the eastbound bridge deck, which includes a 4.7-meter (15.5-foot) bicycle/pedestrian path, is proposed to be 29.7 meters (97.5 feet). The replacement alternatives would increase the surface area exposed to precipitation. A corresponding increase in the quantity of pavement storm water runoff from the East Span during a rainfall event is expected; however, variances in the frequency and intensity of such events make efforts to determine specific volume increases unreliable.

Pollutants commonly found in highway storm water runoff include heavy metals, oil and grease, suspended and dissolved solids, nutrients, bacteria, and some of the hydrocarbons in the gasoline and diesel range. Pollutants less common in highway storm water runoff include volatile organics, semi-volatile organics, phenols, pesticides, polychlorinated biphenyls, and synthetic biocides, depending on the characteristics and location of the highway.

Impacts. Similar to the existing condition, all storm water runoff on a replacement bridge would flow into the Bay.

The proposed replacement alternatives would not be expected to increase concentration levels of those pollutants commonly found in highway runoff, nor is the design expected to elevate the levels of less common constituents. The existing pollution mass is based on total vehicle hours on the structure. For the total mass of pollution to change, either the total usage hours must increase or the pollutant generation rate must increase. Given that the improvements in operations on a replacement bridge should decrease the generation rate due to reduction in stop-and-go traffic, the actual mass of pollutants should decrease. Increased interception of rainfall on a wider structure would not increase the mass of pollutants. In other words, the bridge runoff quantity is not linked to pollutant mass.

The bridge deck drainage area and total runoff volume compared to the overall existing watershed area is on the order of magnitude of 1 to 10^6. Based on this relatively small runoff volume, the pollutant loads would be negligible when compared to the overall pollutant loadings to the Bay from the entire watershed and would not have a net impact on the overall water quality of the Bay.

Water Quality Benefits. There are inherent water quality benefits in the design of the replacement bridge, especially when the features are compared to the existing bridge. Bridge runoff quality is expected to be improved based on the following features:

- Standard Shoulders – The addition of 3-meter (10-foot) wide shoulders would decrease the response time of emergency teams to accidents and spills, thereby increasing the chances that spilled material would not be discharged into the Bay. Emergency vehicles would be able to utilize the shoulders in response to accidents and spills on the replacement structure, whereas the existing bridge requires that traffic be cleared to allow access for emergency vehicles. The shoulders would also provide space for disabled vehicles to be moved so that they do not block traffic, thereby maintaining highway speeds. This would reduce pollutants produced by vehicles as a result of stop-and-go traffic. Additionally, traffic shoulders would allow for improved sweeping operations on a replacement structure, by allowing sweeper vehicles to travel at slower speeds and conduct sweeping operations without the need for lane closures and traffic obstruction.

- Standard Lanes – The lane widths would be increased from 3.5 meters (11.7) feet to 3.7 meters (12 feet). Standard lane widths, in combination with standard shoulders, provide an increased improvement in traffic flow patterns. The improved traffic flow would reduce the amount of stop-and-go traffic on the bridge, thereby reducing those pollutants attributable to stop-and-go traffic.

- Sight Distance – Improvements to the superelevation, vertical and horizontal curvature, and elimination of a double-decked structure would increase sight distances. Increases in sight distances allow drivers to better anticipate changes in roadway conditions and to maintain consistent and comfortable driving speeds.

These benefits reduce accidents and the amount of stop-and-go traffic on the bridge, thereby reducing pollutants attributed to these conditions.

- Concrete Structure – A replacement structure would be a predominantly concrete structure that would have limited exposed steel, which reduces the need for painting and paint removal. Painting would occur once every 10 to 15 years. The portions of a replacement structure that would have exposed steel would be painted with a non-lead paint. Complete containment of residues and liquids from paint removal operations on a replacement structure would continue to be limited due to accessibility and safety. Paint removal operations for vertical surfaces and the cables on a replacement structure would involve the lowest amount of containment due to limited access for maintenance personnel and a lack of available supports for containment structures. The expected high volume elimination of lead paint removal and painting on a replacement structure should provide a long-term reduction in adverse water quality impacts associated with maintenance of the existing structure, since the source of these pollutants, the existing bridge structure, would be removed.

In addition to the benefits provided by a replacement bridge and the removal of the lead source, there are several measures already in place that would continue to help prevent the discharge of pollutants to the Bay. Caltrans has an aggressive emergency response plan for responding to spills of varying magnitudes on the highway system. The current emergency response plan includes monitoring cameras, call boxes, and a 24-hour towing service. The towing service constantly patrols the entire span of the bridge while remaining in communication with both Caltrans and Highway Patrol staff that monitor the bridge via the aforementioned cameras. This plan is updated annually to ensure that on-call contractors have the proper training, equipment, and procedures to respond to spills. In addition to this plan, Caltrans and the California Highway Patrol would continue to prohibit the transportation of hazardous and flammable materials across the bridge.

Considering the design features of the new bridge, the project as planned is expected to improve the overall water quality of bridge runoff.

Best Management Practices. Several best management practices (BMPs) for addressing potential pollutants generated by storm water runoff within the project limits were evaluated. This evaluation was based on right-of-way requirements (area), constructibility, maintenance, safety, feasibility, and cost-effectiveness. Caltrans has prepared a Treatment BMP Feasibility Study for the East Span Project, which describes the evaluation in more detail. This report was submitted to the RWQCB and is available for review at Caltrans District 4 offices

The pollutants addressed in the evaluation are:

- Metals;
- Sediment;
- Oil and grease;
- Bacteria; and

- Nutrients.

These pollutants can potentially be treated by various techniques such as constructed wetlands, detention basins, infiltration basins, infiltration trenches, and sweeping. Some techniques can treat more than one pollutant. Most of the BMPs are land-based facilities (i.e., constructed wetlands, detention basins, infiltration trenches, etc.) that require storm water to be collected and piped off the bridge to a land-based facility. These land-based facilities were not considered to be appropriate primarily because of the high cost associated with placing the piping system on the bridge in contrast to the amount of pollutant removal benefit obtained. The conditions that resulted in the BMPs being considered infeasible are summarized as follows:

- All the BMPs considered would require construction of additional piping on the bridge structure. Due to the high cost and difficulty of construction, piping on the bridge and therefore all BMPs were considered infeasible.

- Infiltration trenches and swales – This BMP requires a large and elongated area to be effective in handling the expected flows from a replacement structure and it relies on pollutant removal by filtration through vegetation, sedimentation, adsorption to soil particles, and infiltration through the soil. For the East Span Project, nearby land-based right-of-way for an adequate trench is limited, and shallow groundwater and low soil permeability would inhibit infiltration.

- Oil/water separators – This BMP is designed to operate at a constant (controlled) flow rate and to remove large amounts of oil and grease from flows with high concentrations. A pump may be required for each separator to facilitate the flow through the system, which requires a power source and adequate space for its installation. Oil/water separators also require a high degree of maintenance for keeping them cleared of debris and other harmful materials. The variable (fluctuating) and high (large volume) flow rates along with relatively low concentrations of oil and grease expected from the storm water runoff at the project site renders such a system ineffective and impractical.

- Infiltration Basins – Sites for this BMP were available, but the high groundwater and low soil permeability inhibits infiltration. The major impediment to infiltration is that the Oakland Touchdown area is composed of fill material, which was most likely to have been compacted upon its initial placement.

- Dry Weather Flow Diversion – This BMP directs flow through a pipe or channel to a local municipal sanitary sewer system for treatment at a local wastewater treatment plant during dry weather. Opportunities for connecting to a sanitary sewer are available; however, the persistence of any dry weather flow from the bridge is not evident. Therefore the limited effect of such a system does not outweigh the significant costs attributed to the piping systems needed to make the conveyance feasible.

- Constructed Wetland – There is currently insufficient data about the effectiveness of this BMP to efficiently remove pollutants from highway runoff. The planned land use

adjacent to a possible constructed wetland site includes the future Gateway Park that will be managed by the East Bay Regional Park District. This raised concerns about conflicts with the proposed park as well as safety and health concerns related to the use of secondary treated water as the main source for establishing and nurturing wetland vegetation. As a result of the unknown effectiveness of this BMP and anticipated land use conflicts, piping storm water to a constructed wetland was determined to be not practical.

- Detention Basin – This BMP was considered to be the most appropriate device for implementation. The basin would need to be lined in order to negate the effects of groundwater. However, as described in the Treatment BMP Feasibility Study, the high cost of implementing a piping system on the bridge outweighs the benefits of pollutant removal.

Caltrans is investigating the effectiveness of enhanced sweepers such as vacuum and regenerative air sweepers to vacuum up the fine particles to which pollutants adhere. Because a replacement bridge would have shoulders and wider lane widths, sweeping effectiveness is expected to be improved; however, enhancement of the sweeper equipment is expected to be consistent with the decisions made for sweeping on a statewide basis. Currently such enhanced sweepers have technological limitations that call their effectiveness into question. These include problems maintaining the vacuum between the machinery and the pavement which is essential to the effectiveness of the device; the tendency of the equipment to act as a plow, pushing the fine materials into drainage outlets; and reduced performance of the equipment on rough pavement.

4.8.2 Groundwater Quality

All Project Alternatives

There are no known long-term impacts to groundwater quality as a consequence of the construction of this project. Section 4.14.7 discusses the potential construction-related water quality impacts, including impacts to groundwater. These would be mitigated with the proper implementation of a Storm Water Pollution Prevention Plan (SWPPP) developed for this project as required by NPDES Permit No. CAS000003. See Section 4.14.7 — Temporary Impacts, Water Resources and Water Quality for more details. The SWPPP would address all construction management practices that have the potential to impact water quality and would identify appropriate control measures to be taken by the Contractor to minimize such potential impacts. The SWPPP will include specific Best Management Practices (BMPs) to be implemented to control and prevent the discharge of pollutants to surface waters as well as groundwater. These BMPs may include dewatering, controlling spills and concrete, sediment control using silt fences.

4.9 NATURAL RESOURCES

Permanent or temporary impacts to natural resources may occur in association with the build alternatives. This section discusses permanent impacts to wildlife species or habitat. Natural resources in the project area were evaluated in accordance with the provisions of state and federal environmental statutes and regulations listed in Section 3.9.1 — Natural Resources, Regulatory Setting. Mitigation measures, where appropriate, have been developed in consultation with regulatory and permitting agencies. Conceptual mitigation measures are described in Section 4.9.6 — Natural Resources, Mitigation.

Four resource and impact categories are discussed below: (1) permanent fill in San Francisco Bay (including opening and shallow water areas and special aquatic sites) and permanent fill in Other Waters of the U.S. (including open and shallow water areas); (2) special aquatic sites such as wetlands, eelgrass beds, or sand flats; (3) special status species such as endangered species, migratory birds, marine mammals, and fisheries; and (4) other natural resources such as coast live oak woodlands.

Temporary impacts to natural resources are identified as impacts from construction activities and are limited to the duration of construction as described in Section 4.14 — Temporary Impacts During Construction Activities.

4.9.1 Placement of Fill in San Francisco Bay

Placement or removal of fill in San Francisco Bay and Other Waters of the U.S. are subject to federal and state regulations. The ACOE regulates fill in Other Waters of the U.S. pursuant to Section 404 of the federal Clean Water Act (CWA). BCDC regulates fill in San Francisco Bay pursuant to the state McAteer-Petris Act. These regulations define fill differently.

Clean Water Act

The CWA is a 1977 amendment to the federal Water Pollution Control Act of 1972, which established regulations for discharging pollutants to Waters of the U.S., such as San Francisco Bay. The primary objective of the CWA is to restore and maintain the physical, chemical, and biological integrity of the nation's waters. The ACOE administers the CWA.

The CWA considers placement of fill in Waters of the U.S. as a negative impact because it may reduce the volume and surface area of water bodies. Under the CWA, fill is defined as "material used for the primary purpose of replacing an aquatic area with dry land, or a change in the bottom elevation of a water body" (Section 404, article 323.2.). Removal of fill is recognized as a beneficial impact because it may result in the restoration or maintenance of the physical, chemical or biological integrity of the nation's waters.

San Francisco Bay's shallow and open water areas are referred to in the text below as Other Waters of the U.S. The analysis of fill in Other Waters of the U.S. does not

include fill in special aquatic sites such as wetlands, eelgrass beds, or sand flats. Impacts to special aquatic sites, as defined by the ACOE, are addressed separately in Section 4.9.2 — Special Aquatic Sites. Under the CWA, the ACOE considers fill in Other Waters of the U.S. to be solid material placed in jurisdictional waters below the mean high water line (MHW), which is approximately +1.42 meters National Geodetic Vertical Datum (NGVD) (+4.63 feet) at YBI and the Oakland Touchdown area.

Net Change in Volume of Other Waters of the U.S. – ACOE.

All replacement alternatives (N-2, N-6, and S-4) would increase the volume of Other Waters of the U.S. as compared to its current volume. Although the replacement alternatives would result in new fill in Other Waters of the U.S. as defined by the ACOE, removal of dredged sediments and the removal of the existing bridge would offset the volume of the new fill. The volume of Other Waters of the U.S. would increase as a result of the following construction activities:

- Removing dredged sediments to create a barge access channel for construction of the replacement alternatives;
- Removing dredged sediments to install piles for the replacement alternatives;
- Removing dredged sediments to create a barge access channel to remove the existing structure;
- Removing dredged sediments to dismantle the existing bridge piles below the mud line; and
- Removing the existing bridge piers and fenders.

Because the replacement alternatives would increase the volume of Other Waters of the U.S., they would have a beneficial impact on Other Waters of the U.S.

The Retrofit Existing Structure Alternative would decrease the volume of Other Waters of the U.S. as compared to its current volume. The Retrofit Existing Structure Alternative requires dredging only to install piles and does not remove the existing bridge. Because the retrofit alternative would decrease the volume of Other Waters of the U.S., it would have a negative impact on Other Waters of the U.S.

Table 4.9-1 summarizes the approximate net change in volume of Other Waters of the U.S. that would occur as a result of the build alternatives.

Table 4.9-1 Net Change in Volume of Other Waters of the U.S. – ACOE

	Build Alternatives			
Activity	**N-6**	**N-2**	**S-4**	**Retrofit**
New Fill from Construction (reduction in volume)	50,400 cubic meters (66,000 cubic yards)	50,400 cubic meters (66,000 cubic yards)	72,100 cubic meters (94,400 cubic yards)	142,300 cubic meters (186,200 cubic yards)
Removal of Sediment (increase in volume)[a]	371,000 cubic meters (485,300 cubic yards)	371,000 cubic meters (485,300 cubic yards)	375,000 cubic meters (490,500 cubic yards)	116,000 cubic meters (152,000 cubic yards)
Removal of Existing Bridge Piers and Fenders (increase in volume)	65,400 cubic meters (85,600 cubic yards)	65,400 cubic meters (85,600 cubic yards)	65,400 cubic meters (85,600 cubic yards)	N/A
Net Change in Volume of Other Waters of the U.S.	Increase of: 386,000 cubic meters (504,900 cubic yards)	Increase of: 386,000 cubic meters (504,900 cubic yards)	Increase of: 368,300 cubic meters (481,700 cubic yards)	Decrease of: 26,300 cubic meters (34,200 cubic yards)

Source: Caltrans 2000.

[a] Removal of sediments for barge access and to prepare for pile installation increases the volume of Other Waters of the U.S. The removal of sediment does not include that portion of the barge access channel that will be restored for eelgrass habitat under the replacement alternatives as described in Section 4.9.6 — Natural Resources, Mitigation. Up to 32,100 cubic meters (42,000 cubic yards) of dredged material may be used to restore a portion of the barge access channel to pre-existing bathymetry.

Net Change in Surface Area of Other Waters of the U.S. – ACOE.

The ACOE also measures fill in Other Waters of the U.S. by surface area. All build alternatives would decrease the surface area of Other Waters of the U.S. as compared to its current surface area. Although all the build alternatives would remove sediments for barge access and to prepare for pile installation and would remove the existing bridge, the fill removal would not offset the surface area of the new fill in Other Waters of the U.S. Since the sediments are submerged, their removal does not contribute to an increase in the surface area of Other Waters of the U.S.

Because the build alternatives would decrease the surface area of Other Waters of the U.S., they would have a negative impact on Other Waters of the U.S. Table 4.9-2 summarizes the approximate net change in surface area of Other Waters of the U.S. that would occur as a result of the build alternatives.

Table 4.9-2 Net Change in Surface Area of Other Waters of the U.S. – ACOE

	Build Alternatives			
Activity	**N-6**	**N-2**	**S-4**	**Retrofit**
New Fill from Construction (reduction in surface area)	1.06 hectares (2.61 acres)	1.06 hectares (2.61 acres)	1.73 hectares (4.29 acres)	1.70 hectares (4.19 acres)
Removal of Existing Sediment[a]	N/A	N/A	N/A	N/A
Removal of Existing Bridge Piers and Fenders (increase in surface area)	0.80 hectare (1.98 acres)	0.80 hectare (1.98 acres)	0.80 hectare (1.98 acres)	N/A
Net Change in Surface Area of Other Waters of the U.S.	Decrease of 0.26 hectare (0.63 acre)	Decrease of 0.26 hectare (0.63 acre)	Decrease of 0.93 hectare (2.31 acres)	Decrease of 1.70 hectares (4.19 acres)

Source: Caltrans 2000.
[a] Removal of submerged sediments to create barge access and to prepare for pile installation does not increase the surface area of Other Waters of the U.S.

McAteer-Petris Act

On the regional level, the San Francisco Bay Conservation Development Commission (BCDC) administers the McAteer-Petris Act, which was enacted by the state legislature in 1965. The McAteer-Petris Act recognizes that San Francisco Bay is a significant economic, environmental, and recreational resource. BCDC was established to address indiscriminant filling of San Francisco Bay.

The McAteer-Petris Act generally identifies the placement of fill in San Francisco Bay as a negative impact since it may reduce the Bay's surface area and volume. Reducing the surface area and volume of the Bay impairs its ability to maintain adequate oxygen levels and assimilate and flush wastes. Removal of fill is considered a beneficial impact to the Bay and is consistent with the McAteer-Petris Act because it may increase the volume and surface area of the Bay.

As defined by BCDC, Bay fill is any solid, pile-supported, floating, cantilevered or suspended material that is placed bayward of the Mean High Tide Line (MHTL) which is approximately +0.82 meters NGVD (+2.68 feet) at YBI and +0.84 meters NGVD (+2.77 feet) at the Oakland Touchdown area, or the +1.5-meter (5.0-foot) contour line where marshlands are present. Unlike the ACOE, the analysis of fill in BCDC's jurisdiction includes fill placed in special aquatic sites such as wetlands, eelgrass beds, and sand flats.

Net Change in Volume of San Francisco Bay – BCDC.

All replacement alternatives would increase the volume of San Francisco Bay as compared to its current volume. Although the replacement alternatives would result in new fill in San Francisco Bay as defined by BCDC, removal of dredged sediments and the removal of the existing bridge would offset the volume of the new fill. The volume of

San Francisco Bay would actually increase as a result of the following construction activities:

- Removing dredged sediments to create a barge access channel for construction of the replacement alternatives;
- Removing dredged sediments to install piles for the replacement alternatives;
- Removing dredged sediments to create a barge access channel to remove the existing structure;
- Removing dredged sediments to dismantle the existing bridge piles below the mud line; and
- Removing the existing bridge piers and fenders.

Because the replacement alternatives would increase the volume of San Francisco Bay, they would have a beneficial impact on the Bay.

The Retrofit Existing Structure Alternative would decrease the volume of San Francisco Bay as compared to the current volume. The Retrofit Existing Structure Alternative requires dredging only to install piles and does not remove the existing bridge. Because the Retrofit Existing Structure Alternative would decrease the volume of San Francisco Bay, it would have a negative impact on the Bay.

Table 4.9-3 summarizes the approximate net change in volume of San Francisco Bay that would occur as a result of the build alternatives.

Table 4.9-3 Net Change in Volume of San Francisco Bay – BCDC

	Build Alternatives			
Activity	**N-6**	**N-2**	**S-4**	**Retrofit**
New Fill from Construction (reduction in volume)	78,900 cubic meters (103,200 cubic yards)	78,900 cubic meters (103,200 cubic yards)	67,800 cubic meters (88,700 cubic yards)	132,500 cubic meters (342,700 cubic yards)
Removal of Sediment (increase in volume)[a]	371,000 cubic meters (485,300 cubic yards)	371,000 cubic meters (485,300 cubic yards)	375,000 cubic meters (490,500 cubic yards)	116,000 cubic meters (152,000 cubic yards)
Removal of Existing Bridge Piers (increase in volume)	60,300 cubic meters (78,800 cubic yards)	60,300 cubic meters (78,800 cubic yards)	60,300 cubic meters (78,800 cubic yards)	N/A
Net Change in Volume of the Bay	Increase of 352,400 cubic meters (460,900 cubic yards)	Increase of 352,400 cubic meters (460,900 cubic yards)	Increase of 367,500 cubic meters (480,600 cubic yards)	Decrease of 16,500 cubic meters (21,300 cubic yards)

Source: Caltrans 2000.

[a] Removal of sediments for barge access and to prepare for pile installation increases the volume of San Francisco Bay. The removal of sediment does not include that portion of the barge access channel that will be restored for eelgrass habitat under the replacement alternatives as described in Section 4.9.6 — Natural Resources, Mitigation. Up to 32,100 cubic meters (42,000 cubic yards) of dredged material may be used to restore a portion of the barge access channel to pre-existing bathymetry.

Net Change in Surface Area of San Francisco Bay – BCDC.

BCDC also measures fill in San Francisco Bay by surface area. BCDC's definition of fill includes high-level suspended fill such as bridge decks or other structures that are placed bayward of the Mean High Tide Line. BCDC considers the footprint of the bridge decks to be fill even where the bridge decks are placed at a significant height above the Bay and generally do not result in adverse impacts to the Bay such as permanent shading of special aquatic sites.

The Retrofit Existing Structure Alternative would not result in a change to the surface area of the Bay as defined by BCDC because the new fill would be placed within the footprint of the existing bridge deck.

When compared to the high-level suspended fill for the existing bridge, the single side-by-side deck configuration for all replacement alternatives (N-2, N-6 and S-4) would result in a net decrease in the surface area of San Francisco Bay. Although all the replacement alternatives would remove sediments for barge access and to prepare for pile installation and would remove the existing bridge, the fill removal would not offset

the surface area of new fill in San Francisco Bay: since the sediments are submerged, their removal does not contribute to an increase in the surface area of the Bay.

Because the replacement alternatives would decrease the surface area of San Francisco Bay, they would have a negative impact on the surface area of the Bay.

Table 4.9-4 summarizes the approximate net change in surface area of San Francisco Bay, including the loss of Bay surface area associated with high-level suspended fill, that would occur as a result of the replacement alternatives.

Table 4.9-4 Net Change in Surface Area of San Francisco Bay - BCDC

	Build Alternatives			
Activity	**N-6**	**N-2**	**S-4**	**Retrofit**
New Fill from Construction (reduction in surface area)[a]	19.02 hectares (47.01 acres)	18.09 hectares (44.90 acres)	17.36 hectares (42.90 acres)	N/A
Removal of Sediment[b]	N/A	N/A	N/A	N/A
Removal of Existing Bridge Deck (increase in surface area)	5.06 hectares (12.50 acres)	5.06 hectares (12.50 acres)	5.06 hectares (12.50 acres)	N/A
Net Change in Surface Area of the Bay	Decrease of 13.96 hectares (34.51 acres)	Decrease of 13.03 hectares (32.40 acres)	Decrease of 12.30 hectares (30.40 acres)	N/A

Source: Caltrans 2000.
[a] Includes coverage of Bay surface area from two parallel bridge decks, which are considered high-level suspended fill.
[b] Removal of submerged sediments to create barge access and to prepare for pile installation does not increase the Bay surface area.

4.9.2 Special Aquatic Sites

Impacts to special aquatic sites, including wetlands, sand flats, and eelgrass beds, are subject to ACOE jurisdiction under Section 404 of the Clean Water Act and BCDC jurisdiction under Section 66605 of the McAteer-Petris Act. Sand flats in the project area provide feeding and resting habitat for shorebirds, and eelgrass provides spawning habitat for herring, among other functions. Section 3.9.3 — Estuarine Environment and Associated Species and Section 3.9.7 — Wetlands and Waters of the U.S. describe the functions and values of special aquatic sites. Table 4.9-5 presents a summary of permanent impacts to special aquatic sites. Temporary impacts are presented in Section 4.14.8 — Temporary Impacts, Natural Resources. A discussion of permanent impacts to special aquatic sites, including jurisdictional wetlands, is provided below.

No-Build and Retrofit Existing Structure Alternatives

The No-Build and Retrofit Existing Structure Alternatives would not affect wetlands, sand flats, or eelgrass beds. Special aquatic sites would be identified as environmentally sensitive areas (ESAs) and marked in the field to prevent disturbance from construction activity.

Table 4.9-5 Permanent Impacts to Special Aquatic Sites and Mitigation Measures

	Wetlands	Sand Flats	Eelgrass Beds
Project Habitat	The tidal wetlands in the project area are located along the north shore of the Oakland Touchdown area and the north side of YBI. These wetlands possess a moderate level of functions and values since they contain non-native plant and animal species. These wetland areas do not provide extensive habitat for wildlife and are not considered high quality. There is 0.5 hectare (0.12 acre) of two non-tidal wetlands located on the southern portion of the Oakland Touchdown area. These wetlands have limited functions and values due to human disturbance and lack of wetland species diversity. They are unlikely to provide habitat for wildlife species.	The sand flats located within the project area occur along the north side of the Oakland Touchdown area. These sand flats provide a moderate level of functions and values for plankton, a broad range of benthic organisms, certain species of fish at high tides, and feeding, bathing, and roosting habitat for a variety of shorebirds.	Five areas of eelgrass beds have been identified. There are two on the north shore of YBI, two on the south shore, and one on the north shore of the Oakland Touchdown area. Their functions are food source, nursery, spawning ground, and/or habitat for resident and migratory species of birds, fish, and invertebrates.

Table 4.9-5 Permanent Impacts To Special Aquatic Sites and Mitigation Measures (Continued)

	Wetlands	Sand Flats	Eelgrass Beds
Area Impacted by Replacement Alternative N-6	No permanent impact.	1.36 hectares (3.36 acres) at Oakland Touchdown as a result of construction of the westbound roadway and realignment of the Caltrans maintenance road and dredging for a barge access channel.	Permanent impacts to 0.21 hectare (0.52 acre) at the Oakland Touchdown area as a result of dredging and 0.01 hectare (0.03 acre) at YBI from construction of barge dock.
Area Impacted by Replacement Alternative N-2	No permanent impact.	1.36 hectares (3.36 acres) at Oakland Touchdown as a result of construction of the westbound roadway and realignment of the Caltrans maintenance road and dredging for a barge access channel.	Permanent impacts to 0.21 hectare (0.52 acre) at the Oakland Touchdown area as a result of dredging and 0.01 hectare (0.03 acre) at YBI from construction of barge dock.
Area Impacted by Replacement Alternative S-4	Permanent impacts to 0.05 hectare (0.12 acre) of non-tidal wetlands on the southern portion of the Oakland Touchdown area from construction.	0.01 hectare (0.03 acre) on south side of YBI as a result of dredging for a barge access channel.	0.15 hectare (0.37 acre) at YBI as a result of dredging and 0.01 hectare (0.03 acre) at YBI from construction of barge dock.
Area Impacted by Retrofit Existing Structure Alternative	No permanent impact.	No permanent impact.	No permanent impact.

Table 4.9-5 Permanent Impacts To Special Aquatic Sites and Mitigation Measures (Continued)

Mitigation	For Replacement Alternative S-4, off-site creation of non-tidal wetlands. For Replacement Alternatives N-6 and N-2 and the Retrofit Existing Structure Alternative, avoidance of habitat by marking the wetlands as Environmentally Sensitive Areas (ESAs). The ESAs would be marked in the field using fencing materials, buoys, or other appropriate, highly visible materials.	On-site restoration of portion of sand flats following construction and off-site creation of a tidal marsh ecosystem, including mudflats and tidal channels.	Harvesting eelgrass from within the barge access channel and replanting in adjacent beds as a pilot program; restoring portions of the barge access channel for colonization by eelgrass in area closest to the Oakland Touchdown; marking eelgrass beds outside barge access channel as ESAs; off-site creation of a tidal marsh ecosystem.

Source: Caltrans, 2000.

Replacement Alternatives N-2 and N-6 (Preferred)

Wetlands.

The wetlands located in the project area would not be affected by Replacement Alternatives N-2 and N-6. The wetlands would be identified as ESAs and marked in the field to prevent disturbance from construction activity.

Sand Flats.

Both northern replacement alternatives would affect intertidal sand flats. Replacement Alternatives N-2 and N-6 (Preferred) would permanently impact approximately 1.36 hectares (3.36 acres) of sand flats along the northern shore of the Oakland Touchdown area due to construction of the westbound roadway and realignment of the Caltrans maintenance road. Sand flats at this location provide habitat for shorebirds.

Eelgrass Beds.

Based on a 1999 eelgrass survey[9], Replacement Alternatives N-2 and N-6 would result in the loss of approximately 0.22 hectare (0.55 acre) of eelgrass beds due to dredging for barge access at the Oakland Touchdown area and for construction of a barge dock at YBI. These eelgrass beds are located on the northern shore of the Oakland Touchdown area and in Clipper Cove on YBI. As discussed in Section 3.9.4 — Wetlands and Waters of the United States, the eelgrass beds are comprised of scattered patches of eelgrass.

Replacement Alternative S-4

Wetlands.

Replacement Alternative S-4 would result in the loss of 0.05 hectare (0.12 acre) of non-tidal wetlands. The affected wetland areas are two non-tidal wetlands located on the southern portion of the Oakland Touchdown. The primary cause of the loss of wetland habitat is the construction of the eastbound roadway and construction staging.

Sand Flats.

Replacement Alternative S-4 would result in the loss of 0.01 hectare (0.03 acre) of sand flats located along the beach on the south side of YBI as a result of dredging for a barge access channel.

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[9] Caltrans completed a pre-construction survey for Replacement Alternative N-6. The physical survey was conducted in October 2000, with data generation and review being completed in January 2001. This survey has a limited purpose as opposed to prior surveys: it is a pre-construction survey intended to provide current data immediately prior to construction of a particular alternative to measure actual impacts to the greatest extent possible. Accordingly, this survey only covers the area impacted by Replacement Alternative N-6. Since the survey was not intended for the purposes of an alternatives analysis, it did not include areas impacted by other alternatives. As anticipated, the area occupied by the eelgrass beds at YBI and the Oakland Touchdown area has changed due to the natural annual variability in such beds. Since the eelgrass beds have grown between 1999 and 2000, the overall percentage of area impacted has not changed to any appreciable degree.

Eelgrass Beds.

Approximately 0.15 hectare (0.37 acre) of eelgrass located within Coast Guard Cove on YBI would be removed by dredging for Replacement Alternative S-4. In addition, construction of a barge dock would displace 0.01 hectare (0.03 acre) at YBI. No impacts are anticipated as a result of the new bridge structure because the bridge would be constructed high enough above the water surface to allow sunlight to penetrate the area from an angle to the north or south.

4.9.3 Special Status Species

Special status species include all plants and wildlife protected under the federal and state Endangered Species Acts, plants listed by the California Native Plant Society, avian species protected under the Migratory Bird Treaty Act, marine mammals protected under the Marine Mammal Protection Act, and fish species protected under the Magnuson-Stevens Act.

No-Build Alternative
Since the No-Build Alternative does not include any disturbance of the existing environment, there would be no impacts to special status plant and wildlife species.

Retrofit Existing Structure
The Retrofit Existing Structure Alternative would have no permanent impacts to special status plant and wildlife species..

Replacement Alternatives N-2, N-6 (Preferred), and S-4
The replacement alternatives would result in permanent impacts to marsh gumplant, double-crested cormorant, American peregrine falcon, western gulls, shorebirds, and Pacific herring. The replacement alternatives would not result in permanent impacts to the California least tern, California brown pelican, saltmarsh common yellowthroat, California clapper rail, Allen's hummingbird, white-tailed kite, American bittern, bank swallow, marine mammals, and protected fish species. A discussion of these species is provided below.

Marsh Gumplant and Alameda Song Sparrow.

As shown in Figures 3-17 and 3-18 in Appendix A, marsh gumplant occurs in four areas within the project area. Impacts to marsh gumplant can be seen on Figures 4-21 and 4-22 in Appendix A. Only one location of marsh gumplant (on the north side of the Oakland Touchdown) would be impacted by the northern replacement alternatives. Replacement Alternative S-4 would result in the removal of marsh gumplant, located to the south of the existing bridge on Port of Oakland property. While these would be impacts to the local marsh gumplant, impacts would not affect the long-term viability of the species because marsh gumplant is widely distributed throughout the San Francisco Bay tidal marsh ecosystem. Marsh gumplant is potential supporting habitat for the Alameda song sparrow. The Alameda song sparrow is a species of concern, but is not listed under either the Federal or State Endangered Species Act. Since the

viability of the marsh gumplant species would not be impacted, there would not be an impact to the Alameda song sparrow as a result of the East Span Project.

Double-Crested Cormorant.

Double-crested cormorants currently nest on the existing East Span. Construction of any replacement alternative would include the dismantling of the existing East Span bridge, which would result in the permanent removal of nesting sites for the double-crested cormorant.

American Peregrine Falcon.

A pair of American peregrine falcons nests on the existing East Span. Construction of a replacement alternative would include dismantling the existing East Span structure, which would result in the removal of the nesting site for the pair. Removal of the bridge could create a long-term impact to the American peregrine falcon. It is anticipated that the pair would nest on a replacement bridge, resulting in no long-term impact.

Shorebird Species.

Shorebirds include migratory birds which are protected under the Migratory Bird Treaty Act. Species of concern also included in this group are the common loon, long-billed curlew, and elegant tern. The replacement alternatives would not result in a direct impact to shorebird species; however, they would result in the removal of supporting roosting and feeding habitat. As discussed under Section 4.9.2, the northern replacement alternatives (Replacement Alternatives N-2 and N-6 [Preferred]) would result in the removal of sand flats. The loss of sand flats (1.36 hectares [3.36 acres]) along the northern portion of the Oakland Touchdown area would decrease the amount of available shorebird habitat. The loss in shorebird habitat is not anticipated to adversely impact shorebirds due to the relatively small area affected by the project.

Replacement Alternative S-4 would result in the removal of upland (0.21 hectare [0.51 acre]) known to be used by shorebirds. The upland area occurs on the south side of the Oakland Touchdown area and provides winter and high-tide roosting habitat for shorebirds.

Western Gull. Direct impacts to the western gull would occur if nests are present on column footings of the existing East Span prior to the dismantling of the structure.

California Least Tern. This species is not known to occur in the project area. However, new information has become available since concluding the endangered species consultation process with USFWS for the East Span Project; this information suggests the least tern may use former Oakland Army Base lands adjacent to the project area and portions of the southern shore of the Oakland Touchdown. These areas would not be permanently impacted by the East Span Project.

Black-crowned Night Heron, Allen's Hummingbird, White-tailed Kite, Bank Swallow, and Bewick's Wren. Permanent impacts to the night heron, Allen's hummingbird, white-tailed kite, bank swallow, and Bewick's wren are not anticipated because vegetation and trees removed during construction on YBI would be replaced as part of a revegetation plan implemented after construction is complete.

Saltmarsh Common Yellowthroat, California Clapper Rail, and American Bittern. Impacts to the saltmarsh common yellowthroat, California clapper rail, and American bittern are not anticipated because these species occur at the Emeryville Crescent, which is located outside of the project area.

California Brown Pelican. Impacts to the California brown pelican would not occur since this species does not nest in the project area.

Pacific Herring. Permanent impacts to Pacific herring as a result of Replacement Alternatives N-2, N-6, and S-4 would include loss of habitat such as eelgrass beds in the project area. Eelgrass beds would be permanently impacted due to dredging for barge access.

4.9.4 Other Natural Communities

Patches of natural communities such as coast live oak woodland, northern coastal scrub, and northern coastal saltmarsh occur within the project area. The replacement alternatives would result in permanent impacts only to the coast live oak woodland on YBI.

Coast Live Oak Woodland

Three patches of coast live oak woodland occur on slopes of YBI. Portions of two of these areas could be removed by the alteration of Macalla Road, which is required for all of the replacement alternatives, including the Preferred Alternative. Macalla Road would be realigned at a lower grade in an area located within the dripline of the tree canopy. This activity would damage the root zone of remaining trees and would result in a loss of six coast live oak trees. The coast live oak trees that would be affected range from 45 to 127 centimeters (18 to 50 inches) diameter-breast-height.

4.9.5 Consultation and Coordination

Consultation and coordination with federal, state, and regional agencies has occurred for the East Span Project. Pursuant to the NEPA/404 Integration Memorandum of Understanding (MOU), Caltrans and FHWA have consulted with U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (ACOE), and National Marine Fisheries Service (NMFS). Per the MOU, concurrence on the project's Conceptual Mitigation Plan for Special Aquatic Sites was requested and received from EPA, ACOE, and USFWS. Although not signatories to the NEPA/404 Integration MOU, Caltrans also coordinated with California Department of Fish and Game (CDFG), the Regional Water Quality Control Board, and BCDC as part of the NEPA/404 process. A summary of the NEPA/404 Integration MOU process and concurrence letters are included in Appendix F.

The ACOE has made a jurisdictional determination in the delineation of waters of the U.S., including wetlands subject to Section 404 of the Clean Water Act. The ACOE concurrence letter can be found in Appendix F.

Consultation with USFWS for species protected under Section 7 of the Endangered Species Act has been concluded. The American peregrine falcon was the only endangered species identified by the USFWS as having the potential to be impacted by the project. The peregrine falcon has been removed from the Federal Endangered Species Act list, but remains on the California Endangered Species Act (CESA) list and is a USFWS species of concern. (See USFWS correspondence dated August 31, 1999 in Appendix G.) In addition, Caltrans is consulting with the California Department of Fish and Game (CDFG) regarding potential impacts to Pacific herring and species regulated under the CESA, such as the American peregrine falcon. Caltrans will also continue to coordinate with CDFG regarding potential impacts to the double-crested cormorant, a California species of concern.

Consultation with NMFS for species protected under Section 7 of the Endangered Species Act has been concluded. Consistent with the mandates of the Magnuson-Stevens Fishery Management and Conservation Act and the Endangered Species Act Section 7 formal consultation process, FHWA and Caltrans consulted with NMFS regarding Essential Fish Habitat (EFH) and/or species protected under Section 7 of the ESA. As requested by NMFS, essential habitat supporting managed fish species was addressed in an Essential Fish Habitat Assessment (provided as an appendix to the June 1999 Biological Assessment that can be reviewed at Caltrans District 4 offices). The NMFS rendered a not likely to adversely affect biological opinion for the project on September 23, 1999 (see Correspondence in Appendix G). Coordination will continue with NMFS concerning the potential for impacts to fish species protected under the Endangered Species Act, including the Chinook salmon and steelhead, and to marine mammals protected under the Marine Mammal Protection Act.

4.9.6 Mitigation

Retrofit Existing Structure Alternative

The impacts of the Retrofit Existing Structure Alternative would occur only during construction. These impacts and their mitigation are discussed in Section 4.14.8 — Temporary Impacts, Natural Resources.

Replacement Alternatives N-2, N-6 (Preferred), and S-4
Special Aquatic Sites.

Impacts to special aquatic sites would be mitigated by on-site restoration of portions of the eelgrass and sand flat habitats and by off-site creation of a tidal marsh ecosystem. Mitigation concepts have been identified in the Conceptual Mitigation Plan for Special Aquatic Sites, which was prepared in coordination with the following agencies: USFWS, ACOE, EPA, BCDC, CDFG, and RWQCB (see Appendix N). The objective of the mitigation is to provide enhanced functions and values relative to the impacted

special aquatic sites. This approach is based on habitat evaluations and is consistent with mitigation for similar projects in the Bay Area.

Consultation with the state and federal agencies listed above will continue during the permitting process. Consultation will be concluded with the preparation and submittal of a Final Mitigation Plan for Special Aquatic Sites that identifies the specific habitat restoration methods, the criteria to be used for monitoring and evaluating the success of the mitigation effort, and a contingency plan if the mitigation fails. The Final Mitigation Plan will be based on the concepts developed in the Conceptual Mitigation Plan summarized below.

On-site restoration of eelgrass and sand flats would occur in the vicinity of the existing eelgrass beds, north of the Oakland Touchdown area. Restoration of the eelgrass beds and sand flats would include:

- Harvesting eelgrass from a portion of the barge access channel prior to dredging and replanting it in adjacent eelgrass beds as a pilot program;
- Restoring a portion of the barge access channel to its original bathymetry and replanting with eelgrass to facilitate re-colonization;
- Restoring portions of the sand flats to original grade; and
- Constructing rock slope protection to provide an upland transition zone.

The goal of the on-site mitigation is to restore existing functions and values to the special aquatic sites in the project area.

Off-site mitigation for eelgrass beds and sand flats would occur at an appropriate site, such as the Breuner property in the City of Richmond, that is approved by state and federal resource agencies. Creation of a tidal marsh ecosystem from existing uplands would include mudflats, tidal channels, and tidal marsh habitat. Restoration of any adjacent uplands and existing jurisdictional wetlands is also included in the mitigation concept. It is anticipated that creation and restoration of complementary habitat types proposed for off-site mitigation would result in greater wetland functions and values than those that currently exist in the project area. Specifically, the new tidal marsh would provide new habitat for the plant and wildlife populations that utilize the Central Bay, including migratory shorebirds and local fish and avian populations. Mitigation would be provided at a 3:1 ratio to compensation for the loss of special aquatic sites.

Special Status Species.

American Peregrine Falcon. The removal of the existing bridge would result in the loss of nesting area for the peregrine falcon. Mitigation, summarized below, would be similar to that outlined in the contract between Caltrans and the Santa Cruz Predatory Bird Research Group (SCPBRG) for the interim seismic retrofit project.

During dismantling of the bridge, a monitor from the SCPBRG would observe the birds' nesting activities. If the dismantling work disturbs nesting activities, the eggs and/or chicks would be collected, raised off-site, and eventually released off-site.

A June 24, 1997 letter from USFWS indicates that peregrine falcons would likely nest on the new bridge once construction activities are complete (see Appendix G). Since these birds of prey are known to use bridges and tall buildings as surrogate nest sites, no nest structures would be created on the new bridge for them. When peregrines recolonize the new bridge, monitoring and off-site release efforts by the SCPBRG would continue as they have for the existing bridge to avoid potential impacts during scheduled maintenance activities.

Double-crested cormorant. Nesting habitat would be constructed on the new bridge.

Shorebird Species. Permanent loss of shorebird roosting habitat as a result of construction of Replacement Alternative S-4 would be offset by enhancement or creation of upland refugia as part of the creation of a tidal marsh ecosystem.

Pacific Herring. Permanent loss of herring habitat (i.e., eelgrass) would be offset by on-site restoration and off-site creation of a tidal marsh ecosystem.

Natural Communities.

Coast Live Oak Woodland. All the replacement alternatives would require realignment of Macalla Road, which could result in removal of or disturbance to the root zone and loss of six trees. Post-construction surveys would be conducted to determine the number of trees actually removed or affected. Oaks would be replaced in accordance with the CCSF tree ordinance. The oak trees would be replaced at a ratio of 3:1 in the same area to create a visual setting comparable to the existing pre-construction condition. Due to the root structure of mature oak trees, it is not certain that Caltrans would be able to successfully plant replacement trees of the same size. As a result, the replacement trees may be smaller than those displaced. After replanting, monitoring and additional replanting would be performed as necessary to ensure success of the new trees. A conceptual mitigation plan, specifying goals, replacement ratio, success criteria, and monitoring would be determined in coordination with the San Francisco Public Works Department that has authority under the CCSF tree ordinance.

4.10 HISTORIC AND CULTURAL RESOURCES

This section reports the potential for East Span Project alternatives to affect archaeological and historic resources. The discussion in this section focuses on historic properties listed or potentially eligible for the National Register of Historic Places (NRHP) pursuant to the National Historic Preservation Act. For a discussion of historic resources in relation to Section 4(f) of the Department of Transportation Act, see Chapter 6.

The consideration of historic resources under Section 4(f) of the Department of Transportation Act differs from their consideration under Section 106 of the National Historic Preservation Act. Section 4(f) applies only to programs and projects undertaken by the U.S. Department of Transportation and only to publicly owned public parks, recreation areas, and wildlife refuges and to historic sites on or eligible for the NRHP. For protected historic sites, Section 4(f) is triggered by the "use" or occupancy of a historic site by a proposed project. In contrast, Section 106 applies to any federal agency and addresses direct and indirect "effects" of an action on historic properties. Section 106 evaluates "effects" on a historic site, while Section 4(f) protects historic sites from "use" by a project. Therefore, even though there may be an "adverse effect" under Section 106 because of the effects upon the site, the provisions of Section 4(f) are not triggered if the project would not result in an "actual use" (occupancy of land) or a "constructive use" (substantial impairment of the features or attributes which qualified the site for the NRHP). Section 106 of the National Historic Preservation Act requires agencies to take into account the effects of their projects on historic properties eligible or listed on the NRHP. Impacts to resources are assessed by application of the Criteria of Effect and Adverse Effect (36 CFR Part 800.9). An undertaking is considered to have an adverse effect on a historic property when the undertaking may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Pursuant to 36 CFR 800.9, an adverse effect on a historic property includes, but is not limited to: (1) physical destruction, damage, or alteration of all or part of the property; (2) isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's eligibility; (3) introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting; (4) neglect of a property resulting in its deterioration or destruction; and (5) transfer, lease, or sale of the property.

To satisfy the federal requirements for Section 106, Caltrans has prepared Finding of Effect Reports for NRHP listed and eligible resources within the project APE. The Section 106 Criteria of Effect and Adverse Effect were used to determine the effects of the proposed project on historic architectural resources and on archaeological resources. Caltrans and Federal Highway Administration (FHWA) have consulted with the SHPO concerning determination of effects (see letter in Appendix G from the SHPO dated September 10, 1998). Per Section 106 regulations, the SHPO concurred that the undertaking has an adverse effect on historic properties and did not comment or concur in what the specific effects to individual properties are.

Mitigation measures discussed in this section have been developed in consultation with the SHPO and Advisory Council on Historic Preservation (ACHP) (see Section 4.10.1 — Historic and Cultural Resources, Consultation for a summary of consultations). Views on mitigation measures have also been solicited from interested parties such as Native Americans, preservation organizations, and public agencies (e.g., the City of Oakland, the Navy, the USCG, and the CCSF).

In accordance with Section 106, measures to mitigate project effects on historic properties have been stipulated in an Memorandum of Agreement (MOA) executed among the FHWA, USCG, the SHPO, and the ACHP, with Caltrans as a concurring party (included in Appendix O). The Navy, local governments, and Native Americans were also invited to sign the MOA as concurring parties.

4.10.1 Consultation

A Finding of Effect for Archaeological Resources and a separate Finding of Effect for Historic Architectural Resources were submitted to the SHPO in July 1998. The SHPO responded concerning determination of effects in letters dated August 3 and September 10, 1998. Caltrans met with Oakland Landmarks Preservation Advisory Board on July 3, 1998, to discuss possible mitigation measures. Caltrans also met with Navy staff on August 25, 1998, to discuss project effects on the historic properties on YBI.

On December 10, 1998, Caltrans met with the City of Oakland and its Landmarks Preservation Advisory Board, the Oakland Heritage Alliance, and the Port of Oakland to discuss possible measures to mitigate project effects on historic properties. On February 1, 1999, representatives from ACHP, Caltrans, FHWA, the Navy, the USCG, CCSF, and the SHPO toured the project area and the historic properties. On February 2, 1999, Caltrans hosted two meetings with historic preservation organizations, ACHP, SHPO, Navy, USCG, FHWA, and city governments. The first meeting included discussion of the replacement alternatives and effects on Navy and USCG facilities of YBI and proposed measures to mitigate project effects on historic properties. The second meeting continued the discussion of measures to mitigate for the loss of the East Span under the replacement alternatives. In October 1999, an Addendum Finding of Adverse Effect and Consideration of Proposed Mitigation Measures (which included a draft MOA) were transmitted to the SHPO, ACHP, Navy, USCG, the CCSF, City of Oakland, and Bay Area historic preservation groups. Comments were received from the USCG, Navy, SHPO, and ACHP. A meeting with the Navy was held on March 1, 2000, to discuss its comments on the MOA. The MOA was revised based on consideration of comments received. The MOA was executed in May 2000, stipulating mitigation measures to be followed on this project (see Appendix O for a copy of the MOA).

4.10.2 Impacts to Archaeological Resources

Replacement Alternatives N-6 and S-4, including temporary detours, would have an impact on CA-SFr-04/H. Replacement Alternative N-2 would have no impact on the site (see Table 4.10-1).

Pursuant to the project MOA, Caltrans would prepare a treatment plan for pre-construction archaeological data recovery. It would be submitted to all parties to the MOA for review and comment. Interested Native Americans would also be invited to participate in development of the treatment plan.

Table 4.10-1 Summary of Effects to CA-SFr-04/H by Alternative

Alternative	Description of Impact to Prehistoric Midden Component of CA-SFr-04/H
No-Build	No work within site boundaries. No impact.
Retrofit Existing Structure	Excavation to strengthen Column YB3 would disturb site.
N-2	No excavation within site boundaries.
Temporary Detours	No impact.
N-6 (Preferred)	Columns for both east- and westbound permanent structures would disturb site.
Temporary Detours	One column for the westbound temporary detour would disturb site.
S-4	Permanent structures would not affect site.
Temporary Detours	Four columns for the westbound temporary detour would disturb site.

Source: Caltrans, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project Finding of Effect for Archaeological Resources Located in the City and County of San Francisco and the City of Oakland, Alameda County, California, July 1998.

A Native American monitor would be present during all archaeological field investigations. If human remains are located, either Native American or non-Native American, Caltrans would ensure that treatment of the remains would comply with all applicable state and federal laws and regulations, including the Native American Graves Protection and Repatriation Act of 1990 (P.L. 101-601, 25 U.S.C. 3001-3013). California Public Resources Code Sections 5097.98 and 5097.99 require protection of Native American remains which might be discovered and outline procedures for handling any burials found.

In all cases where human remains are discovered, the County Coroner would be notified and, in the case of Native American remains, the state Native American Heritage Commission (NAHC) would be notified. Consultation with a Most Likely Descendant designated by the NAHC would be conducted.

If human remains are discovered during construction, all work would cease in the immediate vicinity of the discovery until the appropriate treatment has been completed.

Mitigation for Archaeological Resources: A Treatment Plan would be prepared by Caltrans for pre-construction archaeological investigations. See Stipulation VII of the MOA in Appendix O for more details.

The Treatment Plan would include a data recovery plan for the prehistoric component of CA-SFr-04/H, as well as guidelines for evaluation and data recovery of any other archaeological deposit within the area of the undertaking. The Treatment Plan would address treatment of unanticipated discoveries of any other archaeological deposits, such as historic archaeological remains, within the project construction area.

The Treatment Plan would be consistent with the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation and would take into account the ACHP's publication, Treatment of Archaeological Properties: A Handbook, and SHPO guidelines.

Interested Native Americans will be invited to participate in the development of the Treatment Plan. In addition, Caltrans would also submit the Treatment Plan to all parties to the MOA, including interested Native Americans, for review and comment. Comments received within 30 days would be taken into account.

A Native American monitor would be present during archaeological field investigations. If any buried cultural materials are encountered during construction, work would cease in the vicinity of the discovery, and a Caltrans archaeologist would be contacted to evaluate the finds.

Caltrans would develop public interpretive materials covering historical and archaeological resources within the project area and would disseminate these materials to both the public at large and educational institutions. Interpretive materials may include, but are not limited to: a mobile exhibit on the archaeology and history of Yerba Buena Island (YBI), curriculum materials, a web site, and other public presentations.

4.10.3 Impacts to Historic Architectural Resources

Build alternatives have been determined to affect historical architectural resources within the project limits. Potential impacts are presented in this section. Under the Department of Transportation Act of 1966, all build alternatives result in Section 4(f) use of historic resources. See Chapter 6 — Section 4(f) Evaluation.

No-Build Alternative

The No-Build Alternative would not affect any of the historic architectural resources within the project APE.

Retrofit Existing Structure Alternative

Impacts to historic architectural properties from the Retrofit Existing Structure Alternative would result from modifying the existing SFOBB East Span and change in

views to the Bay from Quarters 1. These changes would result in an impact. Impacts are summarized below.

San Francisco-Oakland Bay Bridge (SFOBB). The Retrofit Existing Structure Alternative would add new piles and pile caps at many columns, construct two new columns at the main span of the cantilever truss, and encase several steel columns in concrete. These changes to the existing structure would substantially alter the East Span portion of this historic structure, resulting in a loss of integrity of design and materials.

There would be no impact to the Caltrans Garage and Caltrans Electrical Substation on YBI, the Caltrans Electrical Substation at the Oakland Touchdown area, and the Key Pier Substation, which are associated with the SFOBB and contributors to the bridge's nomination to the NRHP. The structures would be retained under the retrofit alternative.

Senior Officers' Quarters Historic District (includes Quarters 1 to 7 and Buildings 83, 205, and 230). The retrofit of Columns YB2 through YB4 on YBI would result in encasement of the existing steel columns in concrete. The resulting walls would substantially impair the view from Quarters 1 across the eastern portion of San Francisco Bay. This would constitute a visual intrusion that would diminish an important aspect of the building's setting.

Quarters 1. Retrofit of Columns YB2 through YB4 on YBI, as described above, would result in an impact on Quarters 1.

Quarters 8. No work related to the retrofit alternative would cause impacts to Quarters 8. This residence is located downslope from the existing structure within the USCG base. Bay views from the structure would not be modified by retrofit activities.

Quarters 9. No work related to the retrofit alternative would result in impacts to Quarters 9. This structure is located on Treasure Island Road facing southeast. Views from the structure to the Bay would not be affected, and access to the building would not be modified.

Quarters 10. No impacts would result to Quarters 10 from the Retrofit Existing Structure Alternative. This residence is located at an elevation equal to the bridge decks and is screened from view of the bridge by surrounding oak woodland vegetation.

Building 267. This building is a garage adjacent to Quarters 10 and is screened from view of the SFOBB by surrounding vegetation. No impact to this building would result from the retrofit alternative.

Building 262. The retrofit alternative would have no impact on Building 262. Work to strengthen existing columns on YBI and immediately offshore would not have an effect on the materials or craftsmanship which make the building significant or diminish the understanding of the relationship of the building to early military occupation on YBI.

The retrofitted structure would cause no permanent change in the noise levels from existing conditions.

Replacement Alternatives

Historic architectural resources on YBI and at the Oakland Touchdown area would be affected by some of the replacement alternatives. All replacement alternatives would affect the SFOBB. With the exception of Building 262, properties eligible for historic architectural significance and for association with military history would not be affected by the replacement alternatives; these characteristics which make the properties significant would remain intact after project implementation.

San Francisco-Oakland Bay Bridge (SFOBB). All of the replacement alternatives would require removal of the existing East Span. Dismantling of this historic structure would result in the removal of a structure eligible for listing on the NRHP.

The impacts to four buildings which are associated with the SFOBB and are contributors to the bridge's nomination to the NRHP are discussed below:

Caltrans Garage (Yerba Buena Island). This contributing structure to the NRHP- eligible SFOBB would be removed under all replacement alternatives. This would remove a contributory structure to the NRHP- eligible SFOBB.

Caltrans Electrical Substation (Yerba Buena Island). This contributing structure to the NRHP- eligible SFOBB would be removed under all replacement alternatives.

Caltrans Electrical Substation (Oakland Touchdown Area). The electrical substation at the Oakland Touchdown area adjacent to the SFOBB would not be altered or removed to construct the replacement alternatives. Construction activities conducted adjacent to the substation are not expected to result in damage to the structure.

Key Pier Substation. The Key Pier Substation would not be altered or removed as a result of dismantling of the SFOBB. As a result, the DEIS stated that the Key Pier Substation will not be affected by any of the project alternatives. However, part of the building's significance is as a contributing component of the Bay Bridge. Although the bridge would be dismantled under any of the replacement alternatives, the building would remain individually eligible for NRHP listing for its association with the Key System Railway, but its historic association with the SFOBB would be lost. All replacement alternatives would have an impact on the Key Pier Substation by removing the SFOBB. Also, construction work in the vicinity of the substation could result in inadvertent damage to the structure.

Senior Officers' Quarters Historic District (includes Quarters 1 to 7 and Buildings 83, 205, and 230). Replacement Alternatives N-2 and N-6 would each place the westbound structure over the southeast corner of the historic district. Replacement Alternative N-2 extends approximately 10 meters (33 feet) north of the existing bridge, while Replacement Alternative N-6 extends approximately 12 meters (40 feet) north of the existing bridge, over the historic district. No contributing buildings or landscape features would be altered because no part of Replacement Alternatives N-2 or N-6 would touch any part of the district. No historic characteristics of the district would be diminished. Views from Quarters 1 would be slightly modified by placing concrete columns within view and removing the existing steel column from view.

Replacement Alternative S-4 would shift the new bridge slightly farther away from the historic district than the existing bridge. It would have no impact on the historic district.

Temporary detours (see Figures 2-16.2, 2.17.2 and 2-18 in Appendix A) required for the replacement alternatives would be in place for up to 4 years. Temporary detours would be placed over the historic district. These temporary detours would require construction of numerous column footings within the district. The affected areas would be restored to their prior condition at the completion of the project.

Quarters 1. See Senior Officers' Historic District, above. Replacement Alternatives N-2 and N-6 would not have an effect on Quarters 1. Replacement Alternative S-4 would not have an impact on Quarters 1.

Temporary detours required for the replacement alternatives would be operational for approximately 2 years. The period from the beginning of construction to the end of their operational use would be approximately 4 years. The detours may be removed as soon as they are no longer needed to carry traffic or they may be removed as one of the last steps of bridge construction on YBI, because the contractor may use them as platforms from which to construct other portions of the bridge. Temporary detours would be placed adjacent to the south side of the residence, approximately 2 meters (7 feet) to the south for Replacement Alternatives N-2 and N-6 (Preferred) and 5 meters (16 feet) for Replacement Alternative S-4, with numerous column footings within the viewshed looking out from Quarters 1. Any affected areas within the footprint of the Quarters 1 National Register-described boundaries would be restored to prior condition at the completion of the project.

Quarters 8. Quarters 8 would not be affected by any of the replacement alternatives.

Temporary detours under all replacement alternatives would avoid Quarters 8. The detour structures would be temporary and the affected areas would be restored to their prior condition at the completion of the project.

Quarters 9. Quarters 9 would not be affected by any of the replacement alternatives.

No temporary detours under any of the replacement alternatives would affect Quarters 9.

Quarters 10. Quarters 10 would not be affected by any of the replacement alternatives.

No temporary detours under any of the replacement alternatives would affect Quarters 10. A temporary retaining wall would be constructed on Macalla Road adjacent to Quarters 10. Construction activities in the vicinity of Quarters 10 could result in inadvertent damage.

Building 267. Building 267, a garage, is a contributing structure to Quarters 10. No impact would result to Building 267 due to temporary detours for the replacement alternatives. Construction would require closure of the driveway to the building for approximately one day while the driveway is regraded to align with the new Macalla Road configuration.

Building 262. Replacement Alternatives N-2 and N-6 would have an impact on Building 262; replacement structures would pass above the building at approximately 53 meters (175 feet) above the ground in this area, and the two side-by-side decks would cover the entire length of the building. The close proximity of the new structures would introduce "visual, audible, or atmospheric elements that are out of character with the property." (See Figure 4-24 in Appendix A.) Construction activities in the vicinity and overhead could result in inadvertent damage.

Mitigation for Buildings and Structures: The measures listed below represent mitigation measures stipulated in the MOA (see Appendix O). The MOA is alternative neutral. While stipulations are identified for all alternatives, only those identified for the alternative selected in the Record of Decision will be carried out. The mitigation program for the East Span Project is intended to provide a publicly available record of information for the East Span and other historic properties that would be affected as a result of the proposed project.

Mitigation of Effects on the San Francisco-Oakland Bay Bridge:

- Salvage: Caltrans would offer selected components of the bridge to the East Bay Regional Park District (EBRPD) or other owner of the proposed Gateway Park (south of the new bridge, between the toll plaza and the shoreline in Oakland), for display or other use in the park. Caltrans will also provide the Oakland Museum of California, the Western Railway Museum in Rio Vista, Solano County, and any other interested parties an opportunity to select components of the bridge for curation, display, or other appropriate use.

- Permanent interpretive exhibits: Caltrans would consult with the EBRPD or other owner of the proposed Gateway Park about their interest in having interpretive exhibits incorporated into the design of the park which describe the Bay Bridge as originally constructed. If consultation does not result in agreement between Caltrans and the park owner, Caltrans would seek an alternative East Bay location.

Caltrans would also consult with the City and County of San Francisco (CCSF) about their interest in having similar interpretive exhibits on YBI.

- Museum exhibit: Caltrans would consult with the Oakland Museum of California, the Academy of Sciences in San Francisco, and/or other Bay Area museums about their interest in presenting an exhibit relating to the history and engineering of major bridges of San Francisco Bay.

- At the conclusion of the museum exhibit, Caltrans would select historic items and interpretive materials from the exhibit to be offered to local governments, historical societies, and other interested parties in the Bay Area for permanent curation and public display.

- Oral history: Caltrans would produce oral history documentation related to the construction and operation of the Bay Bridge, which include audio tapes and transcripts and may also include video tapes.

- Documentary videos: Caltrans would provide one or more of the existing documentary videos and current materials about construction of the Bay Bridge to the libraries of Oakland, San Francisco, Emeryville, and Berkeley, as well as the California Historical Society. In addition to the videos, Caltrans would produce curriculum materials and provide them to the public school systems of Oakland, San Francisco, Emeryville, Berkeley, and other school districts upon request.

Mitigation of Effects to the Senior Officers' Quarters Historic District, Quarters 8, Quarters 10, Building 267, and Building 262:

- Protective measures: Caltrans, in consultation with the Navy and USCG, will develop appropriate measures to protect the Senior Officers' Quarters Historic District, Quarters 8, Quarters 10, Building 267, and Building 262 from damage during the undertaking, including vibration monitoring at Building 262 during pile driving in the vicinity of the building and surrounding the building with fencing.

- Repair of inadvertent damage to buildings: Caltrans would ensure that any damage to the Senior Officers' Quarters Historic District, Quarters 8, Quarters 10, Building 267, and/or Building 262 resulting from the undertaking would be repaired in accordance with the Secretary of the Interior's Standards for Rehabilitation.

- Historic structure report: Caltrans would prepare a historic structure report for Building 262 to promote the reuse of this building.

- Restoration of grounds: Caltrans would ensure that the grounds of the Senior Officers' Quarters Historic District, Quarters 8, and Quarters 10 are restored to their condition prior to the start of the undertaking after completion of the bridge project and removal of all temporary structures. Restoration of the grounds would include, but would not necessarily be limited to: new sod in grass areas, replacement of shrubbery and trees; regrading and revegetation of disturbed slopes, including the

planting of mature trees; repair or replacement of damaged paving, sidewalks, and curbs.

- Screen planting: In consultation with the property owner, Caltrans would develop and implement a planting plan to screen the concrete-encased Column YB3 from Quarters 1. FHWA would ensure that final design for any replacement structure minimizes visual and physical impacts to the Senior Officers' Historic District and other historic properties.

Mitigation of Effects to the Caltrans Electrical Substation and Key Pier Substation at the Oakland Touchdown:

- Caltrans would minimize potential for damage during construction to the Caltrans Electrical Substation and Key Pier Substation on the Oakland Touchdown by designating these structures as environmentally sensitive areas (ESAs). The ESAs would be designated on contract plans and in specifications as being off limits to construction activities.

4.11 SCIENTIFIC RESOURCES

Potential exists for paleontologic resources to be disturbed during in-Bay construction to retrofit existing footings and columns for the Retrofit Existing Structure Alternative and construct new footings and columns for the replacement alternatives.

Mitigation: Should any paleontologic resources be discovered during in-Bay construction, Caltrans would ensure that provisions of the California Public Resources Code Section 5097.6 are implemented using their "Interim Guidance for the Identification, Assessment, and Treatment of Paleontological Resources." Any discovered remains would be evaluated by a professional paleontologist and deposited at an appropriate scientific repository such as the Paleontological Museum of the University of California, Berkeley.

4.12 UTILITIES RELOCATION

The backup water supply line on the existing East Span would be retained under the No-Build and Retrofit Existing Structure Alternatives but would be relocated, potentially to the new structures, under the replacement alternatives. In 1944, the Navy entered into an agreement with the State of California which stipulates that the Navy would pay for relocating the water line in the event that it is moved.

The EBMUD outfall, which extends into San Francisco Bay for a distance of approximately 1,600 meters (1 mile), is located to the south of the existing East Span. It is a zero-load facility that cannot support any weight and must be protected or spanned to prevent damage. For Replacement Alternatives N-2 and N-6, a temporary span over the land-based portion of the EBMUD sewer outfall may be necessary for the construction period and the contractor would coordinate it with EBMUD. Replacement Alternative S-4, which crosses the buried outfall line on the Oakland Touchdown, would require that a special design be used to sufficiently span the outfall facility to prevent damage during construction. Caltrans and the contractor will coordinate with EBMUD, if a southern alternative is chosen, to prevent damage to the pipe. Replacement Alternative S-4 would also interfere with access to EBMUD's dechlorination facility due to insufficient vertical clearance between the bridge and the existing service road. It would require relocation of the service road or the dechlorination facility. Caltrans would work with EBMUD to relocate the service road and/or the dechlorination facility to maintain EBMUD's operations during relocation. Caltrans would obtain necessary permits/permit amendments, fund relocation costs, and implement any necessary mitigation.

Electrical power to the islands is provided by PG&E via a Navy-owned pole line along the south side of the approach to the bridge that transitions near the incline to a 34.5 kilovolt submarine cable.

The contractor would have substantial disincentives for disruption of the primary power supply. If an occurrence should unavoidably require dependence on the existing backup power source and if the Navy/CCSF documents the additional cost of using the backup line, Caltrans or the contractor would pay the difference in cost. In addition, if the Navy/CCSF provides documentation for monetary loss in the event that the back-up line also fails, Caltrans or the contractor would also provide reimbursement for the documented losses.

Utilities located on the existing East Span would be maintained under the No-Build and Retrofit Existing Structure Alternatives, but would be relocated under the replacement alternatives. Timing of utility relocations would be set to avoid interruption of service when portions of the existing span would be removed or when it is not possible to maintain them on the existing structure. The Navy/CCSF and USCG will have the opportunity to review and comment on the proposed utilities plans and specifications.

Natural gas is provided to the islands by a 254-millimeter (10-inch) diameter high-pressure submarine gas main from Oakland. Submarine utilities would be avoided to the greatest extent possible. In addition, bridge footings would be located in such a

manner as to avoid impacts to underwater utilities. Contract specifications would include a provision for the contractor to protect submarine utilities during construction. Coordination with utility providers has been initiated to verify locations of submarine utilities and to identify potential conflicts. Coordination with utility providers would continue through the final design process and construction period. If utilities cannot be avoided, they would be relocated or protected in place (e.g., placing a concrete slab over the utility or encasing it in a conduit). Caltrans or the contractor would also repair inadvertent damage resulting from construction activities.

As a result of the federal land transfer (see Section 3.1.1 — Existing Land Uses in the Project Vicinity for more information), Caltrans now owns land in fee on YBI. Caltrans is coordinating with the Navy, CCSF, and the USCG regarding their ability to access utilities within Caltrans' right-of-way.

4.13 ENERGY

4.13.1 Analysis Methodology

This section addresses the impact of the San Francisco Oakland Bay Bridge (SFOBB) build alternatives on indirect energy consumption (i.e., consumed during construction activities). NEPA requires a discussion of energy requirements and conservation measures with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy (40 CFR 1502.16(e)). Energy generation and distribution issues in California in late 2000 and early 2001 have created renewed awareness of electrical energy supply, demand, and distribution.

A long-term energy impact assessment was not prepared for the East Span Project because current guidance for preparing energy analyses only requires a comparison among project alternatives of the barrels of oil consumed from long-term use of the facility. The East Span Project build alternatives do not add traffic capacity compared to the No-Build Alternative. Therefore, long-term oil consumption should be about the same for all project alternatives. There is the potential for the replacement alternatives, which include inside and outside shoulders, to improve traffic operations by minimizing the traffic congestion effects of accidents and breakdowns. The energy consumption benefits of the improved traffic operations of the replacement alternatives would be minimal in comparison to the long-term energy consumption of vehicles using the bridge. It is not possible to measure this slight potential energy reduction due to improved traffic operations of adding shoulders because of the lack of predictability of accidents and breakdowns.

The amount of electrical energy consumption for construction and ongoing electrical needs for this project (roadway lighting, substations, etc.) would be infinitesimal when compared to the energy expended by vehicles using the bridge. There would be no electrical energy savings associated with the project. Electrical usage would remain the same as existing conditions for the No-Build and Retrofit Existing Structure Alternatives since the existing electrical facilities would remain the same. For the replacement alternatives, any savings experienced by the use of new technology would be offset by the increases in electrical usage because a replacement bridge would be longer than the existing bridge and would require additional electrical fixtures.

Indirect energy impacts involve the one-time, non-recoverable energy costs associated with construction of roadways and transportation-related facilities such as bridges. Facility-related energy accounts for energy consumed during the following activities:

- Production of construction materials; and
- Construction of the various build alternatives, including pavement and structures.

Construction of the build alternatives for the SFOBB would be a large-scale effort with many issues, techniques, and methods. Particular issues associated with this project include work to be conducted within the water, access to materials (either by land or water), dismantling activities, dredging activities, pile driving, and others. For a discussion of the construction scenario, see Chapter 2.

The indirect energy analysis was conducted using the Input-Output Method, a standard Caltrans method outlined in the Caltrans 1983 Energy and Transportation Systems Manual. This method was used to convert the 2002 construction dollars, identified in Table 2.4-1 of this document, into energy consumption.[10] (See Section 2.4.2 — Costs for more information.) Although the cost of fuels varies from region to region, this is an appropriate method for analyzing construction energy when limited information is available.

Energy is measured in British thermal units (Btus)[11]. For this analysis the Btus were converted to the equivalent barrels of crude oil for comparison of alternatives. For purposes of comparison, 5.3 million barrels is approximately equivalent to the total daily amount of motor gasoline consumed in the United States or total gasoline sales in one week in California.

4.13.2 Impacts

The indirect energy consumption for construction-related activities for each alternative is summarized in Table 4.13-1. Over 90 percent of the energy expended on each of the build alternatives would be the result of structure and roadway construction. Other elements, such as bicycle/pedestrian paths and lighting would account for a very small portion of the total indirect energy consumption.

No-Build Alternative
There would be no construction costs associated with the No-Build Alternative and, therefore, no expenditure of indirect energy.

Retrofit Existing Structure Alternative
Based on 2002 construction costs of $900 million dollars, the Retrofit Existing Structure Alternative would consume approximately 20,091 billion Btus or 3.5 million barrels of oil during construction.

Replacement Alternative N-2
Based on 2002 construction costs of $1,350 million dollars, the skyway design variation would consume approximately 30,129 billion Btus or 5.2 million barrels of oil during construction. This design variation would not include lighting; therefore, no indirect energy would be expended for this element.

[10] A Btu/$ conversion of 70,100 Btu/$ is based on 1977 construction costs. In order to use the factor of 70,100 Btu/1977 Construction Dollar, a factor of 3.14 was used to convert 2002 construction dollars from 1977 construction dollars. A conversion factor of 70,100 Btu/1977 Construction Dollar is based on the construction of an interchange. The actual amount of energy consumed may be larger, but no database of information for a facility of this type was identified. This estimate provides for a comparison of alternatives.
[11] One Btu is the quantity of energy necessary to raise one pound of water one degree Fahrenheit.

Table 4.13-1 Indirect Energy Analysis

Description	Alternatives									
	Retrofit Existing	Skyway			Cable-stayed Main Span Design Option			Self-anchored Suspension Bridge		
		N-2	N-6	S-4	N-2	N-6	S-4	N-2	N-6 (Preferred)	S-4
2002 Construction Costs (millions)[a]	$900	$1,350	$1,350	$1,350	$1,550	$1,550	$1,600	$1,600	$1,650	$1,600
1977 Equivalent Construction Costs (millions)[b]	$287	$430	$430	$430	$494	$494	$510	$510	$526	$510
TOTAL BTUS CONSUMED (billions)[c]	**20,091**	**30,129**	**30,129**	**30,129**	**34,601**	**34,601**	**35,716**	**35,716**	**36,838**	**35,716**
TOTAL BARRELS OF OIL CONSUMED[d]	3,464,000	5,195,000	5,195,000	5,195,000	5,966,000	5,966,000	6,158,000	6,158,000	6,351,000	6,158,000

Notes:

[a] Construction costs are derived from Table 2.4-1 of this document. The cost information in this table represents the estimated cost of the various alternatives based on information available in 1998. They do represent the current costs of the alternatives, which would be greater, but still have the same relative relationship. See Section 2.4.2 — Costs for more information.

[b] In order to use the factor of 70,100 Btus/1977 Construction Dollar, a dividing factor of 3.14 was used to convert 2002 construction dollars to 1977 construction dollars.

[c] Construction dollars converted to Btus based on construction energy factor of 70,100 Btus/1977 construction dollar (Caltrans 1983).

[d] Based on a conversion factor of 5.8 million Btus/Barrel of crude oil.

Source: Caltrans, September 2000.

The cable-stayed main span design variation would have a 2002 construction cost of $1,550 million dollars. The indirect energy consumption for this alternative would be approximately 34,601 billion Btus or 6.0 million barrels of oil. This alternative would include all facility elements described above.

The self-anchored suspension bridge design variation would have a 2002 construction cost of $1,600 million dollars. Construction energy consumption would be approximately 35,716 billion Btus or 6.2 million barrels of oil. This alternative would include all facility elements described above.

Replacement Alternative N-6 (Preferred)

With a 2002 construction cost of $1,350 million dollars, the skyway design variation would consume approximately 30,129 billion Btus or 5.2 million barrels of oil during construction. This alternative would consume the same energy as Replacement Alternative N-2.

The cable-stayed main span design variation would have a 2002 construction cost of $1,550 million dollars. The indirect energy consumption for this alternative would be approximately 34,601 billion Btus or 6.0 million barrels of oil. This alternative would consume the same energy as Replacement Alternative N-2.

The self-anchored suspension bridge design variation (Preferred design variation) would have a 2002 construction cost of $1,650 million dollars. Construction energy consumption would be approximately 36,838 billion Btus or 6.4 million barrels of oil. This alternative would consume slightly more energy, compared to Replacement Alternative N-2. This alternative would have the highest indirect energy consumption of any of the alternatives.

Replacement Alternative S-4

Based on a 2002 construction cost of $1,350 million dollars, the skyway design variation would consume approximately 30,129 billion Btus or 5.2 million barrels of oil to construct. This alternative would consume the same energy as Replacement Alternatives N-2 and N-6.

The cable-stayed main span design variation would have a 2002 construction cost of $1,600 million dollars. The indirect energy consumption for this alternative would be approximately 35,716 billion Btus or 6.2 million barrels of oil. This alternative would consume slightly more energy, compared to either Replacement Alternatives N-2 or N-6.

The self-anchored suspension bridge design variation would have a 2002 construction cost of $1,600 million dollars. Construction energy consumption would be approximately 35,716 billion Btus or 6.2 million barrels of oil. This alternative would consume the same amount of energy as Replacement Alternative N-2 and slightly less than Replacement Alternative N-6.

The following design considerations would reduce the amount of indirect energy consumed, but are not anticipated to have a significant overall reduction. These

design considerations applied during the planning and construction phases would reduce the amount of indirect energy consumption. Therefore, design and construction of build alternatives would:

- Maximize the use of recycled materials;
- Maximize the use of energy-saving technologies;
- Maintain the performance of construction equipment; and
- Recycle materials used in construction as much as possible and within design specifications.

4.14 TEMPORARY IMPACTS DURING CONSTRUCTION ACTIVITIES

This section describes potential temporary impacts of project alternatives that may occur during construction. Because the No-Build Alternative would not involve any project-related construction, discussions are focused on the build alternatives. Although construction techniques would vary between the retrofit and replacement alternatives, they would have similar construction issues with respect to scale of work and laydown areas on Yerba Buena Island (YBI) and the Oakland Touchdown. As a result, construction impacts on land would generally be similar for all build alternatives. In general, the potential for disruptive construction impacts would correspond to the type and location of activities proposed in each construction stage and to the duration of the overall construction process associated with each alternative.

The Retrofit Existing Structure Alternative is estimated to require about 6 years to construct. For the replacement alternatives, the estimated time required for bridge completion is 5 years, which includes construction of the over-water sections (main span and skyway) and construction of the transition and temporary detours on YBI. It is estimated that the entire project would be completed in 6 to 7 years, which includes dismantling the existing East Span.

4.14.1 Community Impacts

Potential construction period impacts to residents, government facilities on YBI, and businesses at the Oakland Touchdown area are addressed in the following section.

Neighborhoods and Businesses

During construction of the Retrofit Existing Structure Alternative, there would be no ramp closures, roadway modifications, or temporary detours on YBI and the Oakland Touchdown area. However, during construction there could be some delays for motorists as local streets are used for transport of workers, equipment, and materials.

For the replacement alternatives, ramp closures, roadway modifications, and temporary detours on YBI would affect motorists. One road on YBI (Southgate Road) would be closed during construction for a period of approximately 2 years, while other roadways could be subject to periodic lane closures. (See Section 4.14.2 — Transportation Impacts During Construction). Further delays would occur as construction trucks and equipment use local streets.

No matter which alternative is constructed, current uses of Quarters 1-7 would not be desirable during construction due to the following:

- Construction noise (especially nighttime noise) ;
- Lighting for night construction;

- Visual impact of temporary detours for the replacement alternatives and construction activity; and

- The adjoining Parade Grounds are part of the land transferred to Caltrans as a construction easement and would not be available for parking during bridge construction.

Building 262, located at the eastern end of YBI, would be accessible, but would not be usable during construction due to high levels of construction activity and limited access through the construction zone. Building 262 is planned for renovation in Phase 3 of Treasure Island Development Authority (TIDA) plans, expected to occur between 2007 and 2011. However, there are no immediate plans for use of this vacant building. Following construction, the availability of Building 262 would be restored. However, access to the building would be modified. A portion of the access road to Building 262 would be modified to avoid the footings of the eastbound temporary detour and to avoid columns of a replacement bridge. While the eastbound temporary detour is in place, the road would be temporarily realigned approximately 50 meters (164 feet) south of the existing road. For each replacement alternative, a portion of the access road leading to Building 262 would be permanently realigned approximately 15 meters (49 feet) to the south and would become a two-lane roadway that would conform to the existing single-lane dirt road approximately 115 meters (377 feet) from the eastern end of YBI. The roadway configuration would vary slightly for each replacement alternative to avoid different column locations.

Mitigation:

During the construction period, Caltrans would reimburse the City and County of San Francisco (CCSF) for documented loss of rental revenues for Quarters 1-7. As stated in Section 4.10.2 — Impacts to Historic Architectural Resources and the Memorandum of Agreement in Appendix O, a pre- and post-construction survey of Quarters 1-7 and Building 262 would be conducted and construction-related damage to the buildings repaired as necessary. Protective measures would be developed in consultation with property owners.

Construction-period Safety and Security

Heavy vehicle movements, possible hazardous wastes excavation and transport, and construction site activity could create potential safety concerns for construction workers and members of the public on YBI and at the Oakland Touchdown.

Mitigation:

Caltrans would require that best construction management practices be in place to ensure the safety of construction workers, local employees, and residents during construction of the build alternatives. The contractor would implement fencing, signage, and lighting of construction and staging areas; recognized safety practices for the utilization of heavy equipment; the movement of construction materials; and the handling of hazardous materials and wastes in such a way so as to avoid accidents. During construction, Caltrans would require that the project contractor be responsible for job-site

safety and security and prepare a Health and Safety Plan. Temporary detours, lane blockages, and truck entrance locations would be well signed.

Caltrans would apprise police, fire, the Coast Guard, and other emergency response agencies of construction activities, temporary detours, and road blockages throughout the construction process.

The public would be alerted by Caltrans about temporary detours, lane blockages, and truck entrances. These locations would be well signed.

Construction Employment

Economic activity generated by the proposed build alternatives is anticipated to benefit the Bay Area region and would also follow the labor and material markets for highway bridge construction. Refer to Section 4.1.1 — Social and Economic Impacts for a complete discussion of employment-generation impacts of the project.

4.14.2 Transportation Impacts During Construction

Construction activities proposed under all build alternatives would temporarily affect transportation facilities within the project area as described below.

Once the alternative for the East Span Project is selected in the Record of Decision (ROD), Caltrans will prepare a Traffic Management Plan (TMP) with input from local public agencies. It is anticipated there would be no traffic disruptions requiring additional transit services to alleviate short-term impacts. The TMP would address in detail construction-related traffic issues, such as roadway closures, lane closures, access, impacts of "rubbernecking," and provisions for minimizing traffic disruptions. The TMP would include a public awareness campaign involving measures that allow communication of project information to residents, employers, commuters, the media, and public officials.

Traffic Disruptions

Construction activities under all build alternatives would result in some traffic disruption on I-80 and the East Span due to temporary full and partial bridge lane closures during off-peak travel times.

In general, construction of the Retrofit Existing Structure Alternative would result in longer and more frequent lane closures, compared to the replacement alternatives, because construction would occur on the bridge while it is open to traffic. Lane closures could be expected almost every day during the construction period. This condition would persist for much of the six years estimated to construct the retrofit alternative. Closures would be scheduled during periods of the day with lower traffic volumes, with most closures occurring at night.

During the initial stage of construction of the replacement alternatives, the temporary detours on YBI would be connected to the YBI viaduct just east of the tunnel portal. This construction would require closure of traffic lanes on the SFOBB during off-peak travel times. Caltrans is continuing to investigate lane and bridge closures to transition

traffic from the existing bridge to the temporary detours and to a replacement bridge. Caltrans would plan the closures in an effort to simultaneously minimize public inconvenience, facilitate construction, and maximize public safety. The closures would be scheduled to occur during off-peak hours, to the maximum extent feasible.

The replacement alternatives could potentially create additional delays as "rubbernecking" drivers on the existing SFOBB watch construction of the new superstructure and as drivers watch dismantling of the existing bridge from the new bridge. Other activities would generally not be noticeable to drivers, given the restricted field of vision on the existing bridge and the proximity of a new bridge to the existing bridge.

Yerba Buena Island. Construction of any of the build alternatives could cause temporary traffic disruptions as construction-related traffic would be noticeable on local roadways (primarily on Macalla Road) and could contribute to localized congestion from time to time. Heavy trucks on Macalla Road may conflict with other vehicles due to the narrow width and steep grades of the roadway. Truck traffic on Macalla Road would be regulated by flaggers to ensure that there are no conflicts between oversized vehicles and other vehicles. Heavy construction vehicles would also likely cause damage to the pavement on Macalla Road. Local streets would be repaired following completion of East Span construction activities.

Equipment, materials, and work crews would be transported to YBI by motor vehicles and/or barges. As a result, there would be an increase in the volume of vehicles entering and exiting the island. Caltrans will investigate including traffic control measures in the contract specifications to minimize the impacts of the traffic volume increase, which could affect the capacity of the on- and off-ramps.

In addition to temporary traffic disruptions, there would be some longer-term disruptions to YBI roadways (i.e., closures and temporary detours) during the construction period of a replacement alternative. The westbound on-ramp and the eastbound off-ramp on the east side of the island would be closed for approximately 3 years. YBI would remain accessible from the SFOBB from both eastbound and westbound directions. The SFOBB would also remain accessible from YBI in the eastbound and westbound directions.

When the eastbound temporary detour is constructed, Southgate Road would be closed for approximately 2 years. As a result, access from one side of the bridge to the other, east of the tunnel, would be temporarily eliminated. Access from one side of the island to the other would be temporarily via Treasure Island Road. During this time, vehicles traveling to or from San Francisco on the south side of the island would need to make a U-turn at the Treasure Island/Macalla Road intersection.

Several roadways on YBI would require modifications as a result of construction of the new East Span. Macalla Road would be lowered and realigned in the vicinity of Southgate Road to avoid new bridge columns. The USCG road would also have to be realigned to avoid columns. The road that provides access to Building 262 would be modified in two phases (once to avoid the eastbound temporary detour and ultimately

to avoid columns of the new bridge.) These roadways would remain open during realignment to allow for USCG Station access. However, there may be periods when traffic would be restricted to one lane and directed by flaggers.

Macalla Road would remain operable during construction; however, it may be completely closed for brief intervals to all traffic, including USCG traffic. The closures would be a safety measure implemented during certain construction operations, such as the movement of heavy materials that are suspended by crane over the road. The USCG requires emergency access to its facility 24 hours/7 days a week by police, fire, and ambulance services. To maintain access to the maximum extent feasible, Caltrans will investigate including emergency access in the contractor specifications. Requirements in the specifications could include a communication system between field personnel of the contractor and emergency response units to allow for early notification of the need to provide access, making the USCG aware of any closures in advance and setting a maximum time limit for each closure. Caltrans will continue to coordinate with the USCG to establish the most effective means of providing emergency access.

Because the eastern end of YBI would be used for construction staging, public access to the construction area would be restricted. There would be no public access to the Parade Grounds. However, the USCG would have access to its facilities through the construction zone.

A temporary restriction of access to Building 267, the garage at Quarters 10, would be required for construction of any replacement alternative. Vehicular access to the garage would not be available for approximately one day while the driveway is regraded to align with the new Macalla Road configuration. If determined necessary by Caltrans, temporary replacement parking and a temporary walkway from the parking area to Quarters 10 would be provided. The replacement parking would be located as close to Quarters 10 as feasible, such as near Building 240.

The staircase on YBI linking the USCG base with the bus stop at the top of the hill would be displaced due to the placement of the bridge footings for Replacement Alternatives N-2 and N-6. Under Replacement Alternative S-4, the stairway would remain at its current location, but would be closed during construction.

Mitigation:

To maintain access to the USCG facility, Caltrans would require that the contractor construct a detour around the column foundations to keep Macalla Road open or provide another travel way for USCG personnel.

Macalla Road would remain operable during construction; however, it may be completely closed for brief intervals to all traffic, including USCG traffic. To maintain access to the maximum extent feasible, Caltrans will investigate including emergency access in the contractor specifications. Requirements in the specifications could include a communication system between field personnel of the contractor and emergency response units to allow for early notification of the need to provide access,

making the USCG aware of any closures in advance and setting a maximum time limit for each closure. Caltrans will continue to coordinate with the USCG to establish the most effective means of providing emergency access.

Temporary detours would be constructed and flaggers employed to ensure motorist safety for USCG vehicles in the construction zone. Barges would deliver wide and oversized construction loads, where possible.

Caltrans would limit contractor parking to the temporary construction easement.

With a northern alternative, Caltrans would construct a new stairway after consulting with USCG, Navy, and the CCSF about appropriate location. Construction-period shuttle service would be provided with any build alternative to take USCG personnel to and from the MUNI bus stop.

Oakland Touchdown Area. During construction, Replacement Alternatives N-2 and N-6 (Preferred) would require closing the restricted Caltrans maintenance access road on the north side of I-80, which is currently used by authorized vehicles only, eliminating vehicle access to the shoreline west of Radio Beach.

Higher volumes of construction-related vehicle traffic anticipated during construction of the Retrofit Existing Structure Alternative and the replacement alternatives may slightly affect traffic and transit operations. The increased number of trucks on Maritime Street, for example, could potentially cause minor delays to traffic and to Alameda-Contra Costa Transit District (AC Transit) Transbay Route A and Local Route 13. The delay would be roughly equivalent to a missed signal cycle and would be within the range of normal traffic conditions, particularly during peak commute hours. Burma Road and Maritime Street also serve the Port of Oakland and local industry and currently accommodate heavy trucks. The additional construction trucks that would operate on Burma Road and Maritime Street during construction would not likely increase traffic congestion on these streets. No mitigation is recommended for this minor potential delay.

Marine Operations

The in-water construction activities required to construct the retrofit and replacement alternatives would have similar impacts on the movement of commercial vessels and recreational boats. Non-project-related marine traffic would be diverted from areas of construction where barge mooring, pile driving operations, and trestles are in use. The main navigation opening near YBI would remain open during construction. The width of the navigation opening would be reduced during construction but not less than the minimum width required by the USCG. Although navigation routes may be modified, they would meet USCG regulations and standards, and vessels would be able to move unencumbered; any necessary modifications to existing marine traffic would be coordinated with the USCG.

Under the replacement alternatives, the nature, duration, and location of marine construction activities would continually vary due to in-water activities associated with construction of the main span and skyway and dismantling the existing East Span. The

presence of barges, other construction vessels, and temporary falsework would restrict the navigation opening. Additionally, temporary closures of portions of the navigational opening could occur during critical construction points due to overhead hazards.

Mitigation:

Caltrans will consult with the USCG to implement a vessel warning system for periods when construction vessels are placed in the water within the bridge construction zone. Caltrans would obtain a permit to modify the existing bridge or construct a replacement bridge from the USCG pursuant to Section 9 of the Rivers and Harbors Act and the General Bridge Act of 1946. Notification to mariners and other requirements will be specified in the bridge permit.

4.14.3 Construction-period Visual Impacts

All construction activities, whether for seismic strengthening proposed under the Retrofit Existing Structure Alternative or for the replacement alternatives, would involve the use of barges, heavy equipment, stockpiles of soils and materials, and other visual signs of construction. While noticeable to residents on YBI and others in the vicinity, these short-term visual changes, limited to the construction period of approximately five years, would not substantially alter the character of the Bay or the communities on either side. These short-term visual changes do not include the long-term impacts of the clearing and grubbing operations. Approximately 350 trees on the eastern part of YBI would be removed to provide staging areas and clearances for heavy equipment. Most of these trees are eucalyptus with a few being coast live oaks. This visual impact would be mitigated as discussed in Section 4.3.4.

Residents of the Bachelor Enlisted Quarters and the USCG officers' housing as well as users of YBI would experience the most noticeable visual changes during the construction period. Flat areas on YBI are expected to be used as a construction staging area. Activities at this location may block Bay views from Quarters 1-7. Retrofit of existing columns on YBI under the Retrofit Existing Structure Alternative could require temporary structures, such as scaffolding, that would interfere with existing views. New columns constructed under the replacement alternatives would add similar temporary structures.

Replacement alternatives, including the Preferred Alternative, would require the construction of temporary detours on YBI (see drawings of the temporary detours in Appendix A, Figures 2-16.2, 2-17.2, and 2-18). The detours would be operational for approximately 2 years. The period from the beginning of construction to the end of their operational use would be approximately 4 years. The detours may be removed as soon as they are no longer needed to carry traffic or they may be removed as one of the last steps of bridge construction on YBI, because the contractor may use them as platforms from which to construct other portions of the bridge. Columns approximately 2 meters (6.5 feet) in diameter would be constructed to support these temporary detours. The number of columns to be placed on YBI would range from 59 for Replacement Alternative S-4 to 91 columns for Replacement Alternative N-2. The temporary columns would likely restrict views from YBI and would be visible from close- and moderate-range views to the

east side of YBI. However, these columns would be temporary and would be dismantled as soon as possible after opening the new bridge to traffic.

The temporary detours would impact the local vegetation, topography, and, consequently, the appearance of YBI. See Section 4.3.4 for a more detailed description of the impacts of each alignment.

Nighttime construction activities would involve the use of lighting equipment, which could cause glare, potentially affecting residents and marine traffic in the immediate vicinity.

Mitigation:

To reduce glare from lighting used during nighttime construction activities, Caltrans would require project contractors to direct lighting onto the immediate area under construction only and to avoid shining lights towards residences and marine traffic.

4.14.4 Construction-period Air Quality

During some stages of project construction, the Retrofit Existing Structure Alternative and the replacement alternatives would generate air pollutant emissions. The largest sources of anticipated pollutants would be dust generated by excavation, grading, and other ground-disturbing activities on YBI and the Oakland Touchdown, and exhaust emissions from equipment and marine vessels. All construction-related emissions would be temporary and would vary from day to day, depending on the type of work being done. Construction-related emissions would also be experienced at different locations during the construction process, depending on the area(s) under construction at any one time and the distance to likely receptors. Because of the changing nature of these conditions (i.e., construction activity, construction location, and distance to receptors), an exact estimate of total construction emissions and impacts is not possible.

Measures to reduce emissions during construction, as specified in Caltrans' Standard Specifications, include the following:

- Watering exposed soil surfaces;
- Covering trucks transporting dust-producing material leaving or entering a construction site;
- Reducing construction vehicle travel speeds on unpaved surfaces;
- Maintaining equipment per manufacturers' specifications; and
- Conforming with all air pollution rules, regulations, ordinances, and statutes.

Based on the requirement that these measures be included in all contract specifications, no mitigation is proposed.

An air quality evaluation of dredging operations has been completed as part of the Dredged Material Management Plan (DMMP) (see Appendix M) to address the Environmental Protection Agency's (EPA) concerns about construction-period air quality. The analysis concludes that the emissions from dredging would represent an

insignificant portion of the Bay Area emissions. Caltrans would provide the air quality analysis to allow the ACOE to comply with the Clean Air Act.

4.14.5 Construction-period Noise and Vibration

Construction Noise

The Retrofit Existing Structure Alternative and replacement alternatives would result in intermittent and varying levels of construction noise. The Transportation Research Board indicates that typical construction noise levels at a reference distance of 15 meters (50 feet) are:[12]

Ground Clearing (e.g., backhoe)	80 dBA
Excavations (e.g., excavator)	85 dBA
Foundations (e.g., auger drill rig)	85 dBA
Erection of Structures (e.g., concrete mixer)	85 dBA
Finishing (e.g., paver)	85 dBA

Most construction activity related to this project would be associated with the last four categories (which include some of the noisiest operations). Dismantling activities, such as cutting steel and breaking concrete, would probably have similar noise levels. The Transportation Research Board information indicates that the typical noise level generated on a construction site could reach 85 dBA at a distance of 15 meters (50 feet). Noise levels generated by construction equipment (or by any "point source") decrease at a rate of approximately six decibels (dB) per doubling of distance away from the reference distance of 15 meters (50 feet). For instance, at a distance of 60 meters (200 feet) from a noise source, the noise levels would be about 12 dB lower than at the 15-meter (50-foot) reference distance. At Quarters 8, a residence close to all build alternatives (approximately 50 meters [164 feet] away from the construction area for the new bridge structure), the noise level resulting from typical construction activities would be approximately 75 dBA L_{eq}. This is three dBA higher at this location than noise levels caused by existing peak-noise-hour traffic on the existing East Span and would not likely result in a perceptible change. Under the northern replacement alternatives, a noise level of 75 dBA L_{eq} would also occur at Quarters 1, which is not occupied. During construction of the eastbound temporary detour, construction activities would occur approximately 22 meters (72 feet) from the Bachelor Enlisted Quarters. As a result, noise levels during temporary detour construction may be as loud as 82 dBA at this location, an increase of approximately 10 dBA over existing conditions. While construction of a replacement bridge would last a majority of the construction period (approximately 5 years of the total construction period of 7 years, which includes 2 years for dismantling the existing East Span), temporary detours would be constructed in a shorter period of time (approximately 2 years).

[12] Transportation Research Board, National Research Council, National Cooperative Highway Research Program Synthesis 218, Mitigation of Nighttime Construction Noise, Vibrations, and Other Nuisances, 1999.

At a distance of 100 meters (328 feet), the noise from regular construction activities would be approximately 69 dBA L_{eq}; at 200 meters (660 feet), construction noise levels would be approximately 63 dBA L_{eq}; while at 400 meters (1,312 feet), the noise levels would be approximately 57 dBA L_{eq}. Except for construction equipment and material staging areas, construction activities and associated noise would move along the project route as construction proceeded, and, thus, these levels would vary and be intermittent.

Two activities not mentioned in the Transportation Research Board list of noise–generating activities above are rivet busting and pile driving. The Retrofit Existing Structure Alternative would entail a substantial amount of rivet removal. Rivet busting may also be required during dismantling of the existing structure under the replacement alternatives. Observed unshielded noise levels for rivet removal have varied from 86 to 98 dBA at a distance of 15 meters (50 feet). The buildings closest to the existing structure (e.g., USCG Building 40 and Navy Building 213) may experience noise levels (approximately 80 to 92 dBA) when rivet removal is occurring on the bridge portions closest to them during the Retrofit Existing Structure Alternative. Building 40 is currently used for administration purposes and Building 213 is used to store a fire truck. These buildings would be displaced with the northern replacement alternatives. Building 40 would be displaced with Replacement Alternative S-4. The next closest building not displaced by a replacement alternative is Building 262, which is not occupied. Noise levels in this area from rivet busting would be approximately 79 to 91 dBA.

Pile driving during construction would generate noise that is unique in terms of noise level, audible characteristics, and time pattern. The higher levels of pile driver noise, which are maximum levels (L_{max}) of approximately 105 dBA at a distance of 15 meters (50 feet), consist of very-short-duration impact sounds (a "bang" or "clang" noise) concentrated during a 10- to 30-minute period while an individual pile is being driven. These impact sounds attenuate with distance such that the maximum levels will be 99 dBA at 30 meters (100 feet), 93 dBA at 60 meters (200 feet), and 87 dBA at 120 meters (400 feet). Intermittent noise of this nature can be very intrusive to nearby receptors.

Pile driving on YBI would be performed intermittently over a period of about 2 years for all build alternatives. Most of the temporary detours would not require pile driving. The closest pile driving to buildings under the Retrofit Existing Structure Alternative would be 55 meters (180 feet) from Quarters 1 on YBI, resulting in noise levels around 95 dBA.

The replacement alternatives would have pile driving work as close as 45 meters (150 feet) to Building 262 and 80 meters (260 feet) to Quarters 8 and the Bachelor Enlisted Quarters. Quarters 8 and the Bachelor Enlisted Quarters, which are occupied, would experience noise levels from pile driving of approximately 92 dBA. Noise levels around Building 262, which is not occupied, would be approximately 96 dBA. Pile driving would also occur within 60 meters (200 feet) of Building 240 (occupied residential units on Macalla Road, northwest of Quarters 10). Noise levels during pile driving in the vicinity of this building would be approximately 93 dBA.

Based on noise levels recorded during the Pile Installation Demonstration Project, completed in December 2000, and assuming a drop-off rate of 6 dBA per doubling of distance, previous predictions of noise levels near the USCG facility are accurate within 2 dBA. It was also found that noise levels upwind from pile driving operations sometimes

exceed the expected attenuation of 6 dBA per doubling distance from 3 to 8 dBA. That is, upwind locations are quieter than downwind locations at the same distance from a noise source. Winds in the Bay Area have a westerly component, which would put Treasure Island and YBI in an upwind (quieter) condition.[13] Assuming a building attenuation of 25 dBA for the USCG quarters, it is expected that the highest interior noise levels during nearby pile driving operations will be approximately 67 dBA.

Construction noise is unavoidable, temporary, and limited to the time of the construction in any one location (except near the staging areas as noted above). Some nearby USCG residents could be adversely impacted by construction noise. The USCG operates a 24-hour search and rescue operation and, as such, has personnel working in shifts. As a result, there may be staff sleeping at various times of the day. During prolonged pile driving activities within 120 meters (400 feet) or less of USCG facilities, sleep may be problematic. Potential abatement measures may be a combination of attenuation at the noise source, and/or attenuation at the receptor. Caltrans has already investigated such measures as selecting a quieter pile driver, placing a shroud around the hammer, using portable shielding, sound blankets, and plywood sheets. These measures were found not to work for a variety of reasons, including not being effective, challenges in implementation on YBI due to wind conditions and elevation, and cost.

The film studios on TI are located more than 400 meters (1,312 feet) from the project construction site and a minimum of 610 meters (2,000 feet) from the closest pile driving. As a result, the film studios would experience noise levels below 57 dBA during general construction activities and maximum noise levels of approximately 74 dBA during pile driving. During the majority of the construction period, construction-related noise would be below background noise levels (modeled at 67 dBA) at the film studios. Pile driving could result in an increase of up to 7 dBA over existing conditions.

Construction-period Noise Abatement. All construction equipment would be required to conform to the provisions in Section 7-1.01I of the latest edition of Caltrans' Standard Specifications to minimize noise from construction activities, such as maintaining equipment mufflers in proper operating order. The contractor will be required to comply with local noise control ordinances to the extent practicable.

Caltrans will continue to consult with the USCG to identify and implement as feasible reasonable measures to reduce construction-related noise levels at USCG facilities. In addition, Caltrans is continuing to investigate the possibility of limiting the hours for pile driving to reduce the construction noise impacts to residents of YBI and TI.

Data obtained from a Pile Installation Demonstration Project, completed in December 2000, have provided additional information on noise levels from pile driving. The final results will be used to refine appropriate mitigation measures. Caltrans could require contractors to install and use sound-attenuating fabric shrouds around the hammer/pile impact area of pile driver equipment during pile driving to the extent possible to reduce noise levels in sensitive areas such as at the Bachelor Enlisted Quarters. Over-water

[13] Noise and Vibration Measurements with the Pile Installation Demonstration Project, Illingworth & Rodkin, January 26, 2001.

construction sites may not be suitable for this technique. Where practicable, pile holes would be pre-drilled to reduce impacts of pile driving.

Temporary Detour Traffic Noise

To allow for continued utilization of the SFOBB during construction, temporary detours would be constructed at YBI and at the Oakland Touchdown area. It is anticipated that these temporary detours would be in use by motor vehicles for approximately 2 years. The period from the beginning of construction to the end of their operational use would be approximately 4 years. The detours may be removed as soon as they are no longer needed to carry traffic or they may be removed as one of the last steps of bridge construction on YBI, because the contractor may use them as platforms from which to construct other portions of the bridge. These temporary detours vary in design and configuration depending upon the alternative.

Noise generated by detour traffic is anticipated to be similar to noise from existing traffic; e.g., less than 74 dBA at Quarters 1-7 and less than 72 dBA at the USCG residential units. Traffic on the temporary detours used for any of the replacement alternatives would be closer to some locations compared to the existing bridge structure. With the northern alternatives, the temporary detours would be slightly closer to Quarters 1-7 and farther away from the Bachelor Enlisted Quarters and recreational area compared to Replacement Alternative S-4. Noise modeling of the replacement alternatives indicates that noise levels might increase by 1 to 2 decibels at these locations when the temporary detours are closest to them, but these increases would generally not be perceivable.

For the northern replacement alternatives, traffic noise from the temporary detours at the Bachelor Enlisted Quarters would likely be less (1 to 2 decibels lower) than anticipated for Replacement Alternative S-4 due to the greater distance between the temporary detours and the USCG buildings.

Construction Vibration

Vibration levels from construction activities such as pile driving and dismantling of existing column foundations have the potential to cause building damage under certain circumstances. There are no federal or state standards for vibration levels. However, Caltrans has measured vibrations generated during various construction activities on projects throughout the state. Pile driving has frequently been done at distances of 8 to 15 meters (25 to 50 feet) from buildings without causing damage; however, damage that could occur includes displacement of soil and resulting lateral movement. In general, pile driving could produce ground-borne vibration levels that might be perceptible to humans within approximately 200 meters (660 feet) of the pile driving activity, but a building that is more than 15 to 30 meters (50 to 100 feet) from pile driving would not be damaged.[14]

Each of the build alternatives would require work on YBI and at the Oakland Touchdown that would generate vibration. Potential for impacts to structures on YBI and at the Oakland Touchdown is discussed below. The film studios on TI are not

[14] Caltrans, Transportation Related Earthborne Vibrations, Caltrans Experiences, 1992.

discussed below because they are approximately 610 meters (2,000 feet) from the closest pile driving. Vibration guidance from the Federal Transit Administration (FTA) indicates that equipment highly sensitive to vibration would not be affected by pile driving activities more than 274 meters (900 feet) away.[15] As a result, vibration from construction activities would not be perceptible at the film studios.

Retrofit Existing Structure Alternative. This alternative would require pile driving about 55 meters (180 feet) from the closest building (Quarters 1) and would require foundation dismantling about 45 meters (150 feet) from Building 262. At the Oakland Touchdown, the closest foundation dismantling would be about 45 meters (150 feet) from the Key Pier Substation.

Since these buildings are more than 30 meters (100 feet) away from construction activities that would generate vibration, it is expected that vibration levels experienced at these properties would be well below the architectural damage risk level.

Replacement Alternatives. Under the replacement alternatives, the closest building on YBI to pile driving and foundation dismantling would be Building 262. Pile driving would occur approximately 60 meters (195 feet) from this structure, while the closest foundation dismantling would be approximately 45 meters (150 feet) away. The closest pile driving on the Oakland Touchdown would be 110 meters (360 feet) from the Key Pier Substation, and the closest foundation dismantling would be about 45 meters (150 feet) away.

Since these buildings are more than 30 meters (100 feet) away from construction activities that would generate vibration, it is expected that vibration levels experienced at these properties would be well below the architectural damage risk level.

Vibration Abatement:

While no architectural damage is expected to occur as a result from the East Span Project, historic properties (the Senior Officers' Quarters Historic District, Quarters 8, Quarters 10, Building 267, and Building 262) would be monitored for damage as a result of construction activities, including the possible use of vibration-measuring devices on the buildings. Caltrans would photographically document the condition of these buildings prior to the start of construction to establish the baseline condition for assessing damage. Caltrans would ensure that any damage to the buildings resulting from construction activities be repaired in accordance with the Secretary of the Interior's Standards for Rehabilitation.

4.14.6 Hazardous Wastes

The potential for encountering pre-existing hazardous wastes is present during any construction project. Hazardous wastes sites are known to exist in the project area. Hazardous wastes impacts would occur if construction workers, members of the public, and/or Navy and USCG personnel were exposed to hazardous wastes during

[15] Federal Transit Administration, Transit Vibration Assessment Procedures, April 1995.

grading and excavation activities, or if the likelihood of hazardous waste migration were increased by construction activities.

Potential sources of contamination have been identified within all of the project alternative alignments. Areas known or likely to contain contaminated soil and/or groundwater were identified in Section 3.6 of this report. A comparison of potential impacts by alternative is in Section 4.6.

Mitigation: Construction and dismantling of all structures would include procedures for the identification, abatement, handling, and disposal of contaminated materials, as well as worker health and safety. Mitigation measures are discussed in more detail in Section 4.6.3 — Hazardous Wastes, Mitigation. All procedures would be consistent with Caltrans' guidelines and all federal, state, and local laws and regulations.

4.14.7 Water Resources and Water Quality

The project could have adverse impacts on water quality related to construction activities. These include, but are not limited to: excavations for column foundations, resulting in possible groundwater contamination; potential surface water impacts from dredging and dewatering operations, concrete placement, and washout activities; management and application of chemical products; construction activities performed on barges; use of floating batch plants; and the potential for accidental spills from construction equipment and materials. Additional construction-related impacts are associated with the dismantling of the existing East Span, which could include discharges of waste material, accidental spills, and resuspension of bottom sediments.

Statewide NPDES Permit No. CAS000003 applies to the project facilities during construction. The NPDES permit requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for any construction project that disturbs an area greater than five acres or for any project that is located within or near a water-related sensitive environment.

A SWPPP would be prepared for this project. The purpose of the SWPPP would be to:

- Identify pollutant sources that may affect the quality of the discharges of storm water associated with the construction activities of the project; and

- Identify, construct, and implement storm water pollution control measures to reduce pollutants in storm water discharges from the construction site during and after construction.

The objectives of the SWPPP would be: 1) to minimize the degradation of off-site receiving waters to the maximum extent practicable with the current Best Management Practices (BMPs) for the construction industry and 2) to reduce the mass loading of chemicals and suspended solids to the downstream drainage systems and the receiving water bodies.

The preparation of the SWPPP would be based on the principles of BMPs, not numeric effluent limitations, to control and abate the discharge of pollutants into receiving waters. BMPs are structural devices, such as silt fences and straw bales, and non-structural devices, such as good housekeeping and construction-related waste management. Some of Caltrans' BMPs are as follows:

- Spill Prevention and Control;
- Solid Waste Management;
- Hazardous Waste Management;
- Concrete Waste Management;
- Sanitary/Septic Waste Management;
- Vehicle and Equipment Maintenance;
- Straw Bales;
- Illicit Discharge/Illegal Dumping Reporting; and
- Liquid Waste Management.

The SWPPP would be amended whenever there is a change in construction or operations which may affect the discharge of substantial quantities of pollutants into the receiving waters.

Since the dismantling work of the existing East Span under the replacement alternatives would be performed under a separate contract, a SWPPP specific to the dismantling work would be prepared as part of the separate contract. The SWPPP would address specific dismantling activities and BMPs to be implemented to minimize the discharge of pollutants associated with these activities.

4.14.8 Natural Resources

Permanent or temporary impacts to natural resources may occur in association with the build alternatives. This section discusses temporary impacts to wildlife species or habitat. Natural resources in the project area were evaluated in accordance with the provisions of state and federal environmental statutes and regulations listed in Section 3.9.1 — Natural Resources, Regulatory Setting. Mitigation measures, where appropriate, have been developed in consultation with regulatory and permitting agencies.

Temporary impacts to natural resources could result from construction activities on land at YBI and the Oakland Touchdown area and in open water for all build alternatives. Three categories of temporary natural resource impacts are discussed below: (1) temporary fill in San Francisco Bay (including open and shallow water areas and special aquatic sites) and temporary fill in Other Waters of the U.S. (including open and shallow water areas); (2) special aquatic sites such as wetlands, eelgrass beds, and sand flats; and (3) wildlife such as endangered species, migratory birds, marine mammals, and fisheries.

Placement of Temporary Fill in San Francisco Bay and Other Waters of the U.S.

The temporary placement or removal of fill in San Francisco Bay and Other Waters of the U.S. are subject to federal and state regulations. The ACOE regulates fill in Other Waters of the U.S. pursuant to Section 404 of the federal Clean Water Act (CWA). BCDC regulates fill in San Francisco Bay pursuant to the state McAteer-Petris Act. The CWA and the McAteer-Petris Act define temporary fill differently. The regulatory definitions of fill are discussed in Section 4.9.1 — Placement of Fill in San Francisco Bay and Other Waters of the U.S. Impacts associated with permanent fill are also addressed in Section 4.9.1.

Two types of temporary impacts resulting from construction activities were evaluated for each of the build alternatives: (1) the temporary change in the volume of San Francisco Bay and Other Waters of the U.S.; and (2) the temporary change in the surface area of San Francisco Bay and Other Waters of the U.S.

Reductions in the volume and surface area of San Francisco Bay and Other Waters of the U.S. are recognized under the McAteer-Petris Act and the CWA as negative impacts. Temporary fill may impair the physical, chemical, and biological integrity of a water body. Temporary fill may also impact San Francisco Bay's ability to maintain adequate oxygen levels and assimilate and flush wastes.

Temporary Change in Volume of San Francisco Bay and Other Waters of the U.S. All build alternatives would require the placement of temporary fill for in-Bay construction that would temporarily decrease the volume of San Francisco Bay and Other Waters of the U.S. Temporary fill for the replacement alternatives may include:

- Barge docks at YBI to facilitate transport of construction materials, equipment, and personnel;
- Trestles in shallow water areas at the Oakland Touchdown for construction access;
- Small boat dock and concrete load conveyor at the Oakland Touchdown to facilitate construction;
- Cofferdams to install piles and pile caps;
- A geotube for dewatering and construction of the westbound roadway at the Oakland Touchdown;
- Falsework to support new construction; and
- Falsework piers in deep water areas to erect and support the main suspension span.

Construction of the Retrofit Existing Structure Alternative would require placement of cofferdams at new and existing piers and pile-supported trestles in shallow water areas

to provide access for construction equipment and material (see Section 2.6.1 — Retrofit Existing Structure Alternative for a description of construction activities).

Although all fill for temporary structures would be removed at project completion, construction activities would temporarily decrease the volume and surface area of San Francisco Bay and Other Waters of the U.S. Some temporary fill, such as the cofferdams, geotube, falsework, and temporary support structures for the main span would be removed following completion of a particular segment of work. Other temporary fill, such as barge docks, access trestles, the small boat dock, and the concrete conveyor would be in place for the duration of construction, which is approximately six years.

As a result, the build alternatives would have a negative impact. Table 4.14-1 summarizes the temporary change in the volume of San Francisco Bay and Other Waters of the U.S. as a result of the build alternatives.

Table 4.14-1 Temporary Change in Volume of San Francisco Bay and Other Waters of the U.S. – Build Alternatives

Build Alternative	Change in Volume of Other Waters of the U.S. (ACOE Jurisdiction)	Change in Volume of San Francisco Bay BCDC Jurisdiction)
Replacement Alternative N-6 (Preferred)	Decrease of 41,000 cubic meters (54,000 cubic yards)	Decrease of 48,000 cubic meters (63,000 cubic yards)
Replacement Alternative N-2	Decrease of 41,000 cubic meters (54,000 cubic yards)	Decrease of 48,000 cubic meters (63,000 cubic yards)
Replacement Alternative S-4	Decrease of 45,000 cubic meters (58,000 cubic yards)	Decrease of 42,000 cubic meters (54,000 cubic yards)
Retrofit Existing Structure	Decrease of 13,000 cubic meters (17,000 cubic yards)	Decrease of 12,000 cubic meters (15,000 cubic yards)

Temporary Change in Surface Area of San Francisco Bay and Other Waters of the U.S. All build alternatives would require the placement of fill for in-Bay construction that would temporarily decrease the surface area of San Francisco Bay and Other Waters of the U.S. Temporary fill for the replacement alternatives may include:

- Barge docks at YBI to facilitate transport of construction materials, equipment, and personnel;
- Trestles in shallow water areas at the Oakland Touchdown for construction access;
- Small boat dock and concrete load conveyor at the Oakland Touchdown to facilitate construction;
- Cofferdams to install piles and pile caps;

- A geotube for dewatering and construction of the westbound roadway at the Oakland Touchdown;
- Falsework to support new construction; and
- Falsework piers in deep water areas to erect and support the main suspension span.

Construction of the Retrofit Existing Structure Alternative would require placement of cofferdams at new and existing piers and pile-supported trestles in shallow water areas to provide access for construction equipment and material (see Section 2.6.1 — Retrofit Existing Structure Alternative for a description of construction activities).

Although all fill for temporary structures would be removed at project completion, construction activities would temporarily decrease the volume and surface area of San Francisco Bay and Other Waters of the U.S. Some temporary fill, such as the cofferdams, geotube, falsework, and temporary support structures for the main span would be removed following completion of a particular segment of work. Other temporary fill, such as barge docks, access trestles, the small boat dock, and the concrete conveyor would be in place for the duration of construction, which is approximately six years.

As a result, the build alternatives would have a negative impact. Table 4.14-2 summarizes the temporary change in the surface area of San Francisco Bay (including high-level suspended and cantilevered fill) and Other Waters of the U.S. that would occur as a result of the build alternatives.

Table 4.14-2 Temporary Change in Surface Area of San Francisco Bay and Other Waters of the U.S. – Build Alternatives

Build Alternative	Change in Surface Area of Other Waters of the U.S. (ACOE Jurisdiction)	Change in Surface Area of San Francisco Bay (BCDC Jurisdiction)
Replacement Alternative N-6 (Preferred)	Decrease of 0.8 hectare (1.97 acres)	Decrease of 7.12 hectares (17.6 acres)
Replacement Alternative N-2	Decrease of 0.8 hectare (1.97 acres)	Decrease of 7.07 hectares (17.48 acres)
Replacement Alternative S-4	Decrease of 1.05 hectares (2.59 acres)	Decrease of 6.25 hectares (15.44 acres)
Retrofit Existing Structure	Decrease of 0.36 hectare (0.90 acre)	Decrease of 0.36 hectares (0.90 acres)

Special Aquatic Sites

Temporary impacts and disturbance to special aquatic sites are summarized in Table 4.14-3.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would not cause temporary impacts or disturbance to wetlands, sand flats, or eelgrass. There would be no dredging for barge access channels where special aquatic sites are located.

Replacement Alternatives.

Wetlands. No temporary impacts to wetlands would occur as a result of Replacement Alternatives N-2, N-6, or S-4. Replacement Alternative S-4 would permanently remove the two non-tidal wetlands (see Section 4.9,2 — Special Aquatic Sites). The non-tidal wetlands south of the Oakland Touchdown and tidal wetlands at YBI would be avoided and marked as environmentally sensitive areas (ESAs). This would entail placing exclusion devices around them during construction.

Sand Flats. During construction of Replacement Alternatives N-2 and N-6, approximately 0.69 hectare (1.7 acres) of sand flats along the northern shore of the Oakland Touchdown area would be temporarily disturbed. Temporary impacts to intertidal sand flat habitat would result from the placement of a geotube for dewatering purposes and mud boils. Trestles used with Replacement Alternative S-4 would temporarily impact 0.01 hectare (0.02 acre) of sand flats along the south shore of YBI.

Eelgrass Beds. During construction of the replacement alternatives, 0.01 hectare (0.02 acre) of eelgrass would be temporarily disturbed north of the Oakland Touchdown area. Temporary impacts would be caused by increased turbidity from dredging, pile driving, barge maneuvering, and cofferdam construction.

Table 4.14-3 Temporary Impacts to Special Aquatic Sites

	Wetlands	Sand Flats	Eelgrass Beds
Area Impacted by Replacement Alternative N-6	No temporary impact.	0.69 hectare (1.70 acres) at Oakland Touchdown as a result of placement of the geotube.	0.01 hectare (0.02 acre) at the Oakland Touchdown due to increased turbidity from dredging, barge maneuvering, pile driving, and cofferdam construction.
Area Impacted by Replacement Alternative N-2	No temporary impact.	0.69 hectare (1.70 acres) at Oakland Touchdown as a result of placement of the geotube.	0.01 hectare (0.02 acre) at the Oakland Touchdown due to increased turbidity from dredging, barge maneuvering, pile driving, and cofferdam construction.
Area Impacted by Replacement Alternative S-4	No temporary impact. However, there are permanent impacts (see Table 4.9-5).	0.01 hectare (0.02 acre) at YBI as a result of temporary trestle construction.	0.01 hectare (0.02 acre) at the Oakland Touchdown due to increased turbidity from dredging, barge maneuvering, pile driving, and cofferdam construction.
Area Impacted by Retrofit Existing Structure Alternative	No temporary impact.	No temporary impact.	No temporary impact.
Mitigation	Avoidance of habitat by marking the wetlands as Environmentally Sensitive Areas (ESAs). The ESAs would be marked in the field using fencing materials, buoys, or other appropriate, highly visible materials.	In addition to measures listed in Table 4.9-5, placing geotextile fabric and plywood onto the sand flats before placing the geotube to minimize mud boils.	Minimization of impacts to eelgrass through use of specific dredge types, including mechanical clamshell excavator equipment; a turbidity control program, which may possibly include turbidity curtains that control and contain turbidity; marking eelgrass beds outside the barge access channel as ESAs; harvesting eelgrass from within the barge access channel and replanting in adjacent beds as pilot program; restoring portions of the barge access channel and replanting with eelgrass to facilitate eelgrass colonization.

Source: Caltrans, 2000.

Mitigation for Replacement Alternatives:

Sand Flats. To minimize impacts to sand flats at the Oakland Touchdown area, Caltrans would place geotextile fabric and plywood onto the sand flats before placing the geotube. This measure would reduce the potential for mud boils. That portion of the sand flats affected by the temporary placement of a geotube and mud boils would be restored to pre-existing conditions following construction as described in Section 4.9.6 — Natural Resources, Mitigation.

Eelgrass Beds. Construction controls and ESAs would be included in the project plans, specifications, and estimates to avoid impacts as much as possible. Caltrans would monitor for turbidity due to dredging, pile driving, barge maneuvering, and mud boils. A turbidity control program, which may possibly include turbidity curtains, and limitations on barge and tug boat maneuvering would be required. Caltrans is continuing to investigate the design, maintenance, and effectiveness of turbidity curtains. Post-construction surveys to evaluate impacts of turbidity on eelgrass would also be implemented. If additional eelgrass beds have been affected during construction, Caltrans would consult with the permitting agencies to determine if additional mitigation is warranted.

Caltrans would restore a portion of the barge access channel to its original bathymetry. The restoration would occur following construction. Some of the dredged material and excavated sand from the project site suitable for in-Bay disposal would be stockpiled and used to restore the barge access channel to suitable depths for eelgrass re-colonization. The restored channel outside the area shadowed by the westbound structure may be replanted with eelgrass to facilitate re-colonization.

Wildlife

Temporary impacts associated with construction activities, such as loss of habitat or increased turbidity which may cause increased sediment suspension, may impact the American peregrine falcon, double-crested cormorant, chinook salmon, steelhead, green sturgeon, seals, and longfin smelt. A summary of mitigation measures for special status species is provided following the impact discussion.

American Peregrine Falcon. Construction activities for any build alternative may cause temporary impacts to the peregrine falcons during their reproductive cycle. A peregrine falcon pair nests on the existing East Span at Column E2. Construction activities on the existing East Span could induce defensive reactions by the peregrine falcons during the nesting season. Defensive reactions can adversely impact breeding success by jeopardizing egg laying and rearing and therefore result in wasted reproductive efforts.

Double-crested Cormorant. Work at Columns E5 through E15 along the East Span may impact the double-crested cormorant colony nesting on the bridge. Nesting activities may occur at any time within the breeding season between March and September. Construction work during this time period could disrupt some or all of the nesting or attempted-nesting activities.

Western Gull. Construction activities for the retrofit alternative or a replacement alternative could impact breeding and nesting of this species.

California Least Tern. This species is not known to occur in the project area. However, new information has become available since concluding the endangered species consultation process with USFWS for the East Span Project; this information suggests the least tern may use former Oakland Army Base lands adjacent to the project area and portions of the southern shore of the Oakland Touchdown. If portions of the southern shore of the Oakland Touchdown are needed for project construction staging, it would temporarily impact habitat that may be used by the California least tern.

Black-crowned Night Heron, Allen's Hummingbird, White-tailed Kite, Bank Swallow, and Bewick's Wren. Vegetation and tree removal on YBI may impact nesting on YBI.

Shorebirds. Sand flats would be temporarily impacted during construction of a replacement alternative. As a result, there would be a reduction in roosting and feeding habitat for shorebirds. In addition, a small portion of upland habitat located on the south side of the Oakland Touchdown could be temporarily impacted during construction of any of the build alternatives. The area could be used for construction staging. If this occurs, winter roosting and high-tide habitat would be displaced. Caltrans is investigating the feasibility of using this area for construction staging.

Harbor Seal and California Sea Lion. All build alternatives would include pile driving activities that could disturb marine mammals. Noise from pile driving activities may disturb the harbor seals when they are foraging in the waters east of YBI. The haul-out site on the south side of YBI is not used for pupping. It is possible that harbor seals swimming in the project vicinity may be exposed to elevated underwater sound pressure levels (generally 180-190 decibels [dB] or higher), which could produce temporary hearing loss and behavioral impacts (discussed below). Data obtained from a Pile Installation Demonstration Project (PIDP), completed in December 2000, has provided additional information on sound pressure levels produced by pile driving. Initial results indicate no impacts to harbor seals at the YBI haul-out site and minimal impacts to marine mammals at the PIDP site. The final results will be used to refine appropriate mitigation measures.

NMFS considers in-air noise levels below 85 dB to be safe for marine mammals. Marine mammals who have their heads above water at locations close to the pile driving activities may be affected by elevated noise levels. Potential impacts would be similar to those for high underwater sound pressure levels (temporary hearing loss and changes to behavioral patterns).

Behavioral responses of harbor seals and sea lions to noise can range from something as innocuous as a seal raising or turning its head, to permanent abandonment of an area. Noise may elicit short-term disruptions of normal activities, startle responses, agitation, and stress. Existing evidence shows that most marine mammals tend to avoid loud noises. Marine mammals in the water in the project vicinity would be

temporarily displaced if they choose to avoid the area in response to high sound pressure levels.

Gray Whale. Noise from the pile driving activities may disturb gray whales passing through the shipping channel on their way to the southern San Bruno Shoals region. It is possible that gray whales swimming in the project vicinity may be exposed to elevated underwater sound pressure levels which may impact their behavior. Whales are sensitive to high-frequency noises, which are typically not caused by pile driving. It is likely that whales would avoid the pile driving area during the short duration in which they are observed in the Central Bay (typically December to March). Gray whales foraging in the Richardson Bay area are not likely to be impacted because of the distance from the construction site.

Winter-run, Spring-run, and Fall-run Chinook Salmon. Increased turbidity from construction activities such as dredging, pile driving, barge maneuvering, and cofferdam construction could disrupt the runs of Sacramento Valley and Central Valley chinook salmon Ecologically Sensitive Units (ESUs). Adverse impacts to critical habitat for chinook salmon are not expected since the designated critical habitat is located north of the bridge. There is also the potential for adverse impacts from elevated sound pressure levels generated by pile driving.

Steelhead. Migration periods for both the Central Valley steelhead and Central Coast steelhead are similar to that of the chinook salmon. Potential impacts to steelhead are expected to be similar to those for chinook salmon.

Green Sturgeon. Increased turbidity from construction activities associated with any of the build alternatives, such as dredging, may adversely impact this species. Although adult sturgeon may be present in the Bay all year, more sensitive periods occur when juveniles are present during the winter and spring months.

Longfin Smelt. This species is not generally present within the project area, due to the relative high saline conditions. However, if longfin smelt are present in the area during construction, they may be also impacted by increased turbidity.

Pacific Herring. Increased turbidity could adversely impact Pacific herring, a commercially and recreationally important species which spawns in the Bay. The herring attach their eggs to eelgrass, seaweed, pilings, and riprap. If dredging occurs during peak spawning season (January through March), eggs in the project area could be impacted.

Fish (In General). Pile driving during construction may have impacts on fish within the immediate vicinity. Impacts on fish from driving large piles in the Bay are not well documented. During the PIDP, injury and mortality of small fish (including anchovies, herring, and perch) were observed within the immediate vicinity of unattenuated pile driving operations.

Mitigation:

American Peregrine Falcon. , Caltrans and the USFWS have developed mitigation approaches to avoid impacts to the American peregrine falcon. Mitigation includes continuation of the monitoring and release efforts by SCPBRG as described in Section 4.9.6 — Natural Resources, Mitigation. If construction activities disturb nesting activities, the monitors would collect the eggs and/or capture and release any chicks present to a natural off-site location. These measures would apply even though the falcon has been delisted because this species is protected under the Migratory Bird Treaty Act and the California Endangered Species Act.

Double-crested Cormorant and Western Gull. Caltrans would monitor the double-crested cormorant colony during breeding season and prevent the birds from nesting on the existing bridge where potential impacts by construction activities could occur. The protocol to prevent double-crested cormorants from nesting would follow the methods implemented for maintenance activities on the existing bridge. This protocol involves washing partially constructed nests off the bridge with water when the nests are not actively occupied. If the nests are completed and the birds have laid eggs, the nests would not be disturbed. Similar measures would be used to prevent western gulls from nesting.

After construction activities for the Retrofit Existing Structure Alternative are complete, double-crested cormorants would most likely recolonize the same area on the existing bridge structure.

Black-crowned Night Heron, Allen's Hummingbird, White-tailed Kite, Bank Swallow, and Bewick's Wren. Prior to the removal of vegetation and trees during construction of any build alternative on YBI, a biological monitor would survey for nests. Any vegetation or trees with nests or those adjacent to areas with nests would not be removed until the nesting period is complete. Alternatively, to the extent feasible, vegetation and trees that need to be removed could be removed prior to the nesting season (after surveys have been conducted), so as to not affect the construction schedule. Nesting for these species usually occurs between January and July.

Shorebirds. Mitigation for the temporary loss of shorebird roosting habitat as a result of any build alternative would include enhancement or creation of upland refugia as part of creation of the tidal marsh ecosystem as described in Section 4.9.6 — Natural Resources, Mitigation.

Harbor Seal, California Sea Lion, and Gray Whale. The SFOBB Pile Installation Demonstration Project tested the effectiveness of two sound attenuation systems (a bubble curtain and a floating barrier with a contained aerating mechanism) to attenuate underwater sound pressure levels generated by pile driving. Results of the PIDP suggest that the sound attenuation devices tested reduce the sound pressure levels in the vicinity of pile driving activities. Methods, such as a sound attenuation system and/or monitoring, would be used to avoid or minimize impacts to marine

mammals. The decision as to what measures to implement will be made in consultation with the NMFS.

Winter-run, Fall-run, and Spring-run Chinook Salmon, Steelhead, Green Sturgeon, and Longfin Smelt. Caltrans would implement a turbidity control program, which may possibly include turbidity curtains, to avoid and minimize impacts to critical habitat for chinook salmon and other fish. If construction sequencing permits, dredging would be avoided in shallow water during the peak juvenile outmigration period (January 1 through May 31). In addition, pile driving would be scheduled whenever possible to occur outside the peak juvenile outmigration period.

Pacific Herring. Construction activities that occur during the peak herring spawning season, generally January to March, would be monitored by a qualified biologist to watch for the presence of spawning herring. If the biologist (or CDFG) observes spawning in the project area, in-water construction activities such as pile driving and dredging would be suspended within 200 meters (660 feet) of observed spawn. In-water construction activities would not resume at that location for a period of up to 14 days (as determined by a qualified biologist), allowing herring eggs to hatch and larvae to disperse. In addition, the use of a turbidity control program, which may include turbidity curtains during dredging, would reduce the impacts of turbidity on the herring spawn.

Fish. The Biological Opinion from the National Marine Fisheries Service (NMFS) pursuant to the Federal Endangered Species Act states, "Pile driving activities will occur outside of the peak juvenile (salmonid) outmigration period of January 1 through May 31. Should construction extend past this construction window, noise insulation devices will be installed to reduce sound pressure and impulse levels." (See NMFS correspondence, September 24, 1999, in Appendix G.) While the results of the PIDP have not been finalized, preliminary results indicate that use of noise attenuation devices reduces impacts to small fish near pile driving. Caltrans will continue coordinating with NMFS regarding interpretation of the PIDP results. In compliance with NMFS' Biological Opinion, Caltrans will require that attenuation measures be used for any pile driving during the peak juvenile salmonid outmigration period, which would protect non-salmonid species as well.

4.14.9 Historic and Cultural Resources

Construction impacts on cultural resources are discussed along with permanent impacts in Section 4.10 — Historic and Cultural Resources.

4.14.10 Construction Excavation and Dredging

Each of the build alternatives would require excavation on land and dredging in water to retrofit existing, or place new, columns and to allow access to construction sites.

Dredging techniques can generally be categorized as either hydraulic (suction) or mechanical. Hydraulic dredging may involve the use of equipment such as cutterheads, dustpans, hoppers, hydraulic pipelines, and plain suction. The hydraulic

technique typically minimizes disturbance and resuspension of sediments, but involves the entrainment of high volumes of water. The water and sediments would have to be discharged at a disposal location. Mechanical techniques involve the removal of material by equipment such as clamshell (open and closed bucket), dipper, or ladder dredges. Sediments are dislodged and excavated and then raised to the surface and discharged into a barge or scow. Caltrans is still investigating dredging techniques. Factors that will be taken into consideration include cost, feasibility, and minimization of turbidity.

It is the goal that the majority of dredged materials generated by the project would be beneficially reused at upland wetland restoration sites, if such sites are available and are cost-effective. In addition, portions of the barge access channel would be restored after construction for eelgrass habitat using dredged material and excavated sand from the sand flats, resulting in a beneficial reuse. Some dredged materials could be disposed of at approved in-Bay or deep ocean disposal sites. If sites (upland wetland reuse, in-Bay, or ocean) are not available for use or are not cost-effective, Caltrans may opt to beneficially reuse all dredged materials at landfill sites as daily cover.

Materials not suitable for wetland reuse or aquatic disposal would be taken to an appropriate upland landfill. A Dredged Material Management Plan (DMMP) was prepared for the project and is included as Appendix M. This plan assesses impacts from dredging activities associated with construction and evaluates a range of reuse/disposal options for the dredged material. Since publication of the DMMP in June 1999, estimated dredged quantities were further refined. An errata sheet explaining the changes is attached to the DMMP in Appendix M. Updated information in regard to quantities and impacts is also presented in this FEIS.

Anticipated construction scenarios for the build alternatives are discussed in Section 2.6. Excavation requirements of the alternatives are presented below. Impacts to environmental resources as a result of dredging activities and related mitigation measures are discussed within each specific resource discussion and not in this section. Information can also be found in the DMMP.

Retrofit Existing Structure Alternative

Bridge retrofit would require excavation of materials on YBI and in-Bay. Upland work would consist of excavation to expand and encase existing columns on YBI in concrete. Excavated materials on YBI would include soils and rock. These materials would be disposed of at a regulated landfill or used on-site as backfill, if possible.

In-Bay construction work for the Retrofit Existing Structure Alternative would require the construction of cofferdams at each existing and new pier. Dredging would be required in shallow water to create an access channel for barges. Cofferdam dredging would not be required as access dredging in the area of the cofferdams would provide adequate excavation. Estimated excavation quantities for the Retrofit Existing Structure Alternative are presented in Table 4.14-4.

Table 4.14-4 Dredging Quantities

ALTERNATIVE	ACTIVITY									
	Construction Barge Access		Construction of New Piers and Footings		Dismantling Barge Access		Removal of Existing Piers		Total Dredged Volume	
	Volume (m^3)	Volume ($yards^3$)	Volume (m^3)	Volume ($yards^3$)	Volume (m^3)	Volume ($yards^3$)	Volume (m^3)	Volume ($yards^3$)	Volume (m^3)	Volume ($yards^3$)
Replacement Alternative N-6 (Preferred)	153,000	200,000	128,000	168,000	116,000	152,000	16,000	21,000	413,000	540,000
Replacement Alternative N-2	153,000	200,000	128,000	168,000	116,000	152,000	16,000	21,000	413,000	540,000
Replacement Alternative S-4	210,000	275,000	75,000	98,000	116,000	152,000	16,000	21,000	417,000	545,000
Retrofit Existing Structure Alternative	116,000	152,000	—	—	—	—	—	—	116,000	152,000

Source: Caltrans, November 2000.

Construction scenarios for the retrofit alternative would permit work in shallow water areas to take place from temporary construction trestles, shallow-draft barges, or conventional barges. Construction trestles could be constructed along both sides of the existing East Span from the Oakland Touchdown area westward until water depths allow for standard barge access, a minimum draft of 4.3 meters (14 feet) below mean sea level (MSL). The use of conventional barges instead of trestles would require dredging in the shallow water at the Oakland Touchdown area to 4.3 meters (14 feet) MSL. If dredging were to occur, it would be along the western edge of the Oakland Touchdown area only and would not encroach into the eelgrass or sand flat areas near the northern shore. Shallow-draft barges could also require dredging for access, depending on the type of barge selected and the nature of the construction activity.

Replacement Alternatives N-2, N-6 (Preferred), and S-4

As described in Section 2.6 — Construction Activities, construction of the replacement alternatives would require excavation of materials on YBI, the Oakland Touchdown area, and in-Bay. Upland work would consist of excavation to place footings for columns on YBI and the Oakland Touchdown, to place engineered fill and key in the rock slope protection at the Oakland Touchdown for the westbound roadway. Excavated materials on YBI would include soils and rock. These materials would be disposed of at a regulated landfill or used on-site as backfill, if possible.

Excavation at the Oakland Touchdown area would be required to place columns to support the structures as they come to grade. Soils excavated at the touchdown would be disposed of at off-site locations. Some of the soils may contain hazardous materials and would require disposal at approved upland sites.

Anticipated construction techniques for replacement alternatives would require the use of large-scale construction equipment such as pile drivers and cranes mounted on barges. These barges typically require a minimum draft of 4.3 meters (14 feet) MSL, which would require dredging in shallow water. This minimum draft includes a 0.6-meter (2-foot) additional depth to avoid the need for maintenance dredging over the five-year construction period and to provide a conservative estimate of potential total dredged material quantities. Where water depths are less than minimum barge draft, work could also be conducted from trestles near the Oakland shore, but access dredging would still be necessary. The width of the barge access channel would be 50 meters (165 feet). The access channel adjacent to the Oakland Touchdown would be reduced to a 3.7-meter (12-foot) depth and the width of the channel narrowed to 45 meters (150 feet) to minimize the impacts of dredging on special aquatic sites (see Section 4.14.8 — Temporary Impacts During Construction, Natural Resources). Anticipated dredge volumes for barge access are presented in Table 4.14-4.

In-Bay work to dismantle the existing East Span would require excavation to remove existing bridge piers. Cofferdams could be constructed at each pier to remove pile caps, piers, and footings below the existing mudline. Different approaches to pier removal are under consideration. One approach would use standard-draft barges similar to those proposed to construct replacement alternatives. This would require access dredging on one side of the existing East Span to allow barge access. Sections of the existing bridge would be lowered into barges for removal to onshore

sites for further dismantling. Estimated excavation volumes for removal of the existing East Span are summarized in Table 4.14-4.

Volumes of dredged material would be generated throughout the construction and dismantling activities. Most of the volumes, however, would be generated during three periods:

- Dredging the barge access channel for the skyway portion;
- Dredging the barge access channel for the Oakland approach;
- Dredging the barge access channel for the suspension span at YBI (Replacement Alternative S-4 only); and
- Dredging related to dismantling the existing bridge.

Figure 4-23 in Appendix A shows anticipated monthly volumes over the course of new bridge construction and dismantling of the existing bridge. Approximately 97,000 cubic meters (127,000 cubic yards) would be dredged between months 2 and 7 for construction barge access. Volumes would drop between months 8 to 21 to about 7,400 cubic meters (9,600 cubic yards) per month when only sediment removal for pier construction for the skyway and main span would be occurring. Volumes would increase in months 22-24 as construction access for the Oakland approach would be conducted as well as some excavation for piers. Limited (approximately 460 cubic meters [600 cubic yards]) dredging would occur for pier construction during months 25-50. This volume amounts to less than one full barge trip per month. No sediment removal is anticipated between months 51 and 60.

As dismantling the existing bridge begins, approximately 116,000 cubic meters (152,000 cubic yards) would be dredged for creation of the barge access channel (months 41 to 72). Volumes during this time frame would be approximately 1,300 cubic meters (1,700 cubic yards) per month of sediment dredged to remove existing bridge footings and piles.

Reuse/Disposal of Excavated and Dredged Material

Some excavated upland soils from YBI and the Oakland Touchdown are expected to be contaminated and would require disposal at an approved upland disposal site.

A range of 36 potential in-Bay, ocean, and upland/wetland reuse sites listed in the 1998 San Francisco Bay Conservation and Development Commission (BCDC) Roadmap[16] were initially considered in the DMMP. These sites were screened based on availability of the sites during the East Span Project construction time span (e.g., would the site be permitted and accepting dredged material by mid-2001) and the capability of the site to receive the volumes and type of material generated. Most of the sites considered were either reserved strictly for specific projects (e.g., federal channel maintenance dredging) or were planned but would not likely have environmental permits needed prior to the start of the East Span Project dredging activities.

[16] The Roadmap is a compilation of existing and planned sites identified by BCDC and the U.S. Army Corps of Engineers that can potentially accommodate current and potential dredged Bay materials.

The above assessment narrowed the list of potential in-Bay, ocean, and upland/wetland reuse sites candidates to four practicable candidates: 1) Alcatraz (SF-11); 2) the San Francisco Deep Ocean Disposal Site (SF-DODS); 3) the Hamilton Wetlands Restoration Project; and 4) the Montezuma Wetlands Restoration Project (Figure 4-1 in the DMMP [Appendix M]). These sites are already permitted or may be permitted by the start of dredging activities for the East Span Project. In addition to these sites, upland disposal at a landfill and sidecasting of the material (dredging and placing the material immediately to the side of the dredged channel) were also considered. Each of these options was evaluated in terms of affected environment, implementability of the option, environmental impacts, and economic factors. These are discussed in detail in the DMMP (Appendix M). Since publication of the DMMP, another beneficial reuse has been considered. As part of the on-site mitigation for special aquatic sites, Caltrans is proposing to restore up to approximately 0.7 hectare (1.7 acres) of the barge access channel with stockpiled dredged material and excavated sand to facilitate eelgrass colonization.

In determining the preferred reuse/disposal option, several criteria were used in the decision-making process. These included:

- **Impact of Reuse/Disposal Option on Project Schedule —** Can the site accept the quantities of material as they will be generated (i.e., larger quantities at the beginning of construction and dismantling activities, with smaller quantities in the intervening months)?

- **Reliability of the Site —** Will the site be permitted and operational in time to accept dredged material?

- **Consistency with the Goals of the Long-Term Management Strategy (LTMS) —** In general, the goals of the LTMS are to use most dredged material for upland wetland reuse with ocean disposal as a "relief valve". In-Bay disposal would be reduced over time to a smaller percentage of total dredged materials.

- **Consistency with Individual Permitting Requirements —** Can the option be permitted by the various permitting agencies including the ACOE, BCDC, and the San Francisco Bay Regional Water Quality Control Board (RWQCB)?

- **Suitability for Wetland Reuse or Aquatic Disposal —** Sediment testing was conducted in November 1996 for the Retrofit Existing Structure Alternative and in June 2000 for Replacement Alternative N-6 (Preferred). The results of the testing indicate suitability of most of the material for wetland reuse or unconfined aquatic disposal. Testing of the barge access channel for dismantling would be done in the future, as requested by the DMMO.

- **Environmental Impacts —** Biological, water quality, and air quality impacts were the focus of the impact analysis.

- **Costs —** Costs for use of each of the sites included transportation costs, number of barge trips, distance, volume of material, tipping fees for site use, monitoring costs, etc.

Table 7-1 of the DMMP (Appendix M) provides a comparison of the various sites based on the above criteria. The comparative evaluation suggested that no single reuse/disposal option was preferred for all dredged materials generated by the East Span Project, given the differences in capacity, suitability, costs, and logistics. In general, environmental impacts at the reuse/disposal sites were not an important factor because they were already mitigated at the reuse/disposal sites as part of the site design (e.g., Hamilton, Montezuma, landfills) or are kept to minimal levels through volume and seasonal restrictions on disposal (SF-11, SF-DODS). The results of the DMMP indicated that reuse of the sediment for upland wetland creation would have beneficial impacts. Sidecasting was the only option considered in the DMMP that could have potentially substantial environmental impacts. Caltrans does not propose to sidecast any of the dredged material.

Preferred Reuse/Disposal Option

The preferred reuse/disposal option outlined in the DMMP (Appendix M) would be to beneficially reuse the majority of the material at an available upland wetland restoration site, if such a site is available and cost-effective. If approved sites are not available, Caltrans may beneficially reuse materials at landfill sites as daily cover or dispose of materials at the deep ocean disposal site. Caltrans also plans on beneficially reusing some dredged material and excavated sand to restore a portion of the barge access channel at the Oakland Touchdown to facilitate eelgrass colonization. A much smaller amount of material is proposed for disposal at the Alcatraz site. This would consist of small quantities of material (approximately 460 cubic meters [600 cubic yards]) that would be generated on a monthly basis during pier construction. This option is being proposed due to the logistics of transporting and disposing of small monthly loads. Dredged material determined to be unsuitable for aquatic disposal or wetland reuse would be taken to an appropriate landfill for disposal. Determination of the suitability of material during construction would be based on the results of the sediment sampling and analysis described in Section 3.12.2. The Sediment Sampling and Analysis Report (available for review at Caltrans District 4 offices) presents testing results at multiple locations along the Preferred Alternative alignment. The DMMO reviewed this report and its conclusions in regard to the suitability of dredged materials for unconfined disposal are presented in Section 3.12.2. A copy of its October 31, 2000, letter is presented in Appendix G. The disposal goals for the project are consistent with the goals of the LTMS.

Aquatic disposal of excavated materials would require permits and approvals from federal, state, and regional permitting agencies. Caltrans has consulted with agencies, including the ACOE, BCDC, RWQCB, U.S. Fish and Wildlife Service (USFWS), EPA, California Department of Fish and Game (CDFG), and California Department of Toxic Substance Control (DTSC), regarding applicable permits and approvals to dispose of materials at specified sites.

4.15 CUMULATIVE IMPACTS

East Span Project build alternatives would contribute to both beneficial and negative cumulative impacts. Although all East Span Project build alternatives would be expected to contribute to cumulative impacts, the Retrofit Existing Structure Alternative would have fewer negative cumulative impacts than the replacement alternatives. This is due primarily to the increased construction footprint of the replacement alternatives.

The cumulative impacts analysis determined that some temporary cumulative impacts would result from construction activities. Temporary impacts caused by the construction of the East Span Project occurring simultaneously with impacts resulting from construction of other projects were combined to evaluate whether there are temporary cumulative impacts. Resource categories that would experience temporary cumulative impacts are land use, traffic, air and water quality, special status species, and energy consumption. Long-term cumulative impacts of the East Span Project replacement alternatives in combination with other projects would occur in the resource categories of land use, Bay fill, special aquatic sites, other natural communities, and archaeological resources. The East Span Project replacement alternatives would contribute to beneficial cumulative impacts in the resource categories of non-motorized transportation, long-term visual changes, and dredge material reuse/disposal.

4.15.1 Regulatory Framework

NEPA regulations developed by the Federal Council on Environmental Quality (CEQ) require that the cumulative impacts of a proposed project be addressed in an EIS (40 CFR Section 1508.25). Cumulative impacts on the environment are those that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions (40 CFR Section 1508.7). These impacts can result from individually minor impacts of multiple actions over time.[17]

4.15.2 Methodology and Format

This cumulative analysis considers past, present, and reasonably foreseeable future projects that involve impacts to the same resource categories as those impacted by the East Span Project. Since eight commenters (EPA, ACOE, California Preservation Society, National Trust for Historic Preservation, Earth Island Institute, BART, City of Oakland Planning Department, and Save San Francisco Bay Association) commented on the Draft EIS cumulative impacts analysis, the entire cumulative impacts analysis has been updated and expanded.

The analysis addresses impact categories of a regional nature, such as natural resources, by consideration of actions that may result from the implementation of plans by regional agencies that manage or regulate potentially impacted resources. Regional plans consulted in this assessment include the Regional Transportation Plan (RTP), the Transportation Improvement Program (TIP), BCDC Bay Plan and Seaport

[17] Council On Environmental Quality Executive Office of the President, Considering Cumulative Effects Under the National Environmental Policy Act, January 1997, pg. 1. The terms "effect" and "impact" are used interchangeably in this section (40 CFR 1508.8).

Plan, the Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS), the Baylands Ecosystem Habitat Goals Report, the State Implementation Plan for attaining air quality goals and the San Francisco Bay Regional Water Quality Control Board Basin Plan. Other known agency-sponsored or reviewed projects undertaken or planned that may not be included in these plans have also been addressed in this analysis. These projects are identified for each subject area.

Impact categories, such as land use, which are discussed at the local geographic level, are addressed in this cumulative analysis by consideration of the plans and projects being implemented by Caltrans, the City of Oakland, the City and County of San Francisco, and the East Bay Regional Park District. Recent projects and local development plans of the Port of Oakland, Port of San Francisco, Port of Richmond, and San Francisco International Airport are also incorporated into the analysis.

Regulatory and Geographic Context

The examination of each environmental resource category begins with a discussion of regulatory and geographic context. Regulatory context refers to the legal framework within which each environmental resource category is governed. For example, Section 404 of the federal Clean Water Act protects special aquatic sites such as wetlands, eelgrass, and sand flats. The cumulative impacts of the East Span Project and other actions are discussed in the context of policy requirements for no-net-loss of these protected resources. The geographic context varies by environmental resource category. For example, resource discussions such as dredging address geographically large areas because cumulative impacts are most accurately understood in the context of San Francisco Bay and not by jurisdictional boundaries of governmental entities. In the Bay Area, planning for dredged material disposal and reuse is taking place at a Bay-wide or regional level; therefore, the cumulative impacts are considered at a regional level.

The potential for cumulative impacts on some environmental issues such as land use are evaluated in a local geographic context. A local context applies to land use and transportation issues because the East Span Project would not change traffic capacity that could potentially alter regional land use planning decisions.

Trends for historical patterns of resource use are described for each resource category. A review of these trends provides context for the impacts analysis because there is limited information available about specific past projects that can be analyzed in consideration of other past, present, and future actions. For example, the trend for air quality in the Bay Area is based on reductions in pollutant emissions since passage of the federal Clean Air Act.

Past actions for each environmental resource are included in the description of context.

Because the goal of the cumulative analysis is to consider how the East Span Project, in combination with past, present, and reasonably foreseeable future actions cumulatively affects the resources, understanding trends in the stability, use, or viability of the resource over time is relevant. The timeframe in which each resource is

examined is determined by the availability and relevance of "the best data we have or are able to collect" with regard to other projects and environmental trends for the resource (CEQ 1997). The timeframe for construction-period impacts is generally considered to be the construction timeframe for the East Span Project.

The discussion of each environmental resource category also provides a brief summary of the East Span Project's impact and a reference to other sections of the EIS where the resource is described and the impact assessment is reported.

4.15.3 Land Use

Context

The regulatory context for examining cumulative land use impacts is at the local and regional planning levels. Comprehensive plans and redevelopment plans of the cities of San Francisco and Oakland set policies for current and future development within and around the project limits. Regional plans such as the BCDC Bay and Seaport Plans have been factors in recent planning actions and will influence future redevelopment decisions. The geographical context for land use is Yerba Buena Island (YBI) and the Oakland Touchdown area; the geographic context is also defined by the physical structure of the bridge which has influenced past land use decisions and may affect existing and future land uses (see Section 4.1.5 — Community Impacts, Development Trends). These regulatory and geographic contexts are based on the fact that the East Span Project would maintain the current traffic capacity of the SFOBB and, therefore, would not induce any new development growth nor would the East Span Project increase access, which could support more intense development.

Available planning documents and policies were considered to assess potential impacts of future projects over an approximately 20-year planning horizon. Future projects are the adopted or pending land use planning decisions for residential and mixed-use development on the YBI property anticipated to be released to the CCSF by the Navy and described in the Draft Naval Station Treasure Island Reuse Plan (1996 Draft Reuse Plan) and potential expansion of USCG facilities on YBI. Future projects at the Oakland Touchdown area are a proposed public park at the southwestern end of the Oakland Touchdown area as well as other development identified in the Draft Oakland Base Reuse Plan.

Yerba Buena Island. YBI has been owned by the U.S. government since 1868. The flat areas of the island have been developed for military uses since that time. Other than Building 213, Navy-owned buildings located on the flat portions of YBI have been removed. YBI was under the control of the U.S. Army from 1868 to 1897, at which time it was transferred to the U.S. Navy for use as a training station. Soon after the transfer, Congress made an appropriation to establish a Naval Training Station for apprentices on the Pacific Coast; during World War I, there were as many as 13,000 men training on the island.

In 1872, a USCG predecessor agency, the Lighthouse Service, was established on 12 hectares (29 acres) of YBI. A signal station and buoy depot were built and the lighthouse was constructed in 1875. When the Bureau of Lighthouses and the USCG

merged in 1939, the USCG was given control of the 12 hectares (29 acres). In 1973, the radar facilities and control center of the USCG Vessel Traffic Service San Francisco were moved to YBI from Fort Mason in San Francisco.

Presently, the USCG conducts search and rescue missions; it also operates a buoy repair and navigation control center facility on YBI. It now encompasses approximately 17 hectares (41 acres). The Navy holds title to most of the remaining land on the island and is working with the CCSF to transfer the land to it through the Base Realignment and Closure (BRAC) process. Approximately 8 hectares (20 acres) of Navy land were recently transferred to Caltrans as permanent right-of-way for all alternatives under consideration, another 31 hectares (77 acres) were transferred for temporary construction easements. Of these 31 hectares (77 acres), 11 hectares (26 acres) are land and the remainder consists of former Navy waters surrounding Yerba Buena Island.

Sections 3.1.1 — Existing Land Uses in the Project Vicinity and 3.1.2 — Developable Land and Development Trends, Yerba Buena Island and Treasure Island further discuss existing and proposed land uses on YBI.

The SFOBB opened in 1936 and provided road access to the island. The adjacent Treasure Island (TI) was partly created from the materials excavated for the tunnel on YBI. TI was the site for the 1939-40 Golden Gate International Exposition.

The Navy and CCSF planning processes will influence future land use on the Navy-controlled portion of YBI. The CCSF prepared a 1996 Draft Reuse Plan that includes several scenarios of residential and mixed-use development on YBI (see 3.1.2 — Developable Land and Development Trends, Yerba Buena Island and Treasure Island). In addition, local land use will be influenced by BCDC's Bay Plan, which states "If and when not needed by Navy or Coast Guard; redevelop released areas for recreational use." Implementation of the CCSF's Draft Reuse Plan would require an amendment to the Bay Plan, to delete YBI's designation as a park priority use.

Oakland Touchdown Area. The Oakland Touchdown area considered in this analysis is the portion of the peninsula west of the SFOBB Toll Plaza (see Figure 2-2 in Appendix A). The Oakland Touchdown area is a manmade peninsula that has expanded over time to serve transbay transportation facilities. Since the late 1880s land uses on the Oakland Touchdown have generally been for transportation purposes and later for military functions. It was the east end of the Key System pier, which connected the East Bay rail transit system to the Key System ferry terminal. In 1936, the peninsula was widened to the north for the bridge approach and toll plaza of the SFOBB. Existing land uses on the Oakland Touchdown area include an EBMUD dechlorination facility; the existing bridge and Caltrans maintenance facilities; industrial, maritime, transportation, and commercial activities related to the Port of Oakland; and a Resource Conservation area designated in the City of Oakland's General Plan. Future trends are the same except for the conversion of 6 hectares (14.7 acres) of military land at the western end of the Oakland Touchdown area to park use. The affected environment of the Oakland Touchdown area is also discussed in

Sections 3.1.1 — Existing Land Uses in the Project Vicinity and 3.1.2 — Developable Land and Development Trends.

Future land uses at the Oakland Touchdown area are the subject of current land use planning efforts by federal, state, and local agencies. The majority of this area was designated as a "port priority use area" in the April 1996 San Francisco Bay Seaport Plan Update, issued jointly by BCDC and MTC, and the BCDC San Francisco Bay Plan. This area is known as the Bay Bridge site. In addition, the Oakland Base Reuse Authority (OBRA) has designated a 6-hectare (14.7-acre) parcel, formerly part of the Oakland Army Base, as a future park. Amendments to the OBRA Draft Final Reuse Plan have been initiated with the goal of preserving the Port's space requirements to meet future operational needs. BCDC recently deleted the Oakland Touchdown area as a port priority use from its Seaport and Bay Plans. The use of the Oakland Touchdown area is now the responsibility of the local government, the City of Oakland. BCDC can now approve any use of the site as long as it is consistent with BCDC's permitting authority to ensure maximum feasible public access consistent with the proposed project and to minimize Bay fill.

The Resource Conversation Area designated in the Oakland General Plan includes landscaped uplands, sand flats, sand dunes, and tidal marshes along the north shore of the Oakland Touchdown and to the east and north of the project limits. The trend for these areas is their conservation and enhancement. Areas within the Emeryville Crescent to the east of the East Span Project limits have been incorporated into the East Shore State Park that is being planned and developed by the East Bay Regional Park District. A master planning process for the East Shore State Park was initiated in late 2000 and is expected to be completed in approximately two years. It is expected that the areas along the north shore of the Oakland Touchdown area would continue in their current use as landscaped uplands, sand flats, sand dunes, and tidal marshes with limited public access.

Impacts Analysis

Yerba Buena Island. Project impacts to land use on YBI are described in Section 4.1 — Community Impacts. Other, and greater, impacts on land uses on YBI would result from the planned transfer of the Navy-owned land to CCSF and any changes resulting from USCG planning.

With regard to land on YBI under jurisdiction of the USCG, the East Span Project impacts range from no impact under the Retrofit Existing Structure Alternative to the removal of four existing buildings, reconfiguration of the existing main facility access gate, and placement of columns supporting the new structure under Replacement Alternative S-4. More intense development could result from future redevelopment of the facility by the USCG. However, at this time, no specific master plan has been developed for expansion of the existing USCG facility because USCG delayed final master plan preparation pending outcome of the TI BRAC process and final design for the East Span Project. While the USCG facility does have undeveloped areas, it cannot be determined at this time what changes to land use might occur.

With regard to land to be redeveloped by the CCSF under the 1996 Draft Reuse Plan, many changes to existing land use are anticipated. Under the 1996 Draft Reuse Plan, developed through the BRAC process, more intensive development of live/work cottages and loft spaces, a conference center and potential commercial redevelopment of Building 262 at the easternmost point of YBI are planned.

The existing access to YBI provided by the SFOBB is an integral part of all reasonably foreseeable land use plans for the island. The USCG facility could continue to operate and the proposed land uses discussed in the 1996 Draft Reuse Plan could be implemented with any of the East Span Project alternatives. The East Span Project is not expected to influence land use decisions by the CCSF, although permitting authority of BCDC, market factors, and environmental resources may influence ultimate land use patterns. Reasonably foreseeable development plans of the USCG cannot be assessed. The implementation of both the East Span Project and the 1996 Draft Reuse Plan would increase the density of development on YBI compared to present conditions. The potential increase in density resulting from CCSF-sponsored redevelopment combined with the increased number of columns for the SFOBB on YBI would result in a cumulative impact on land use.

Oakland Touchdown Area. Since the late 1800s, land uses at the Oakland Touchdown area have been transportation and military. Since 1936, the Oakland Touchdown has accommodated the existing bridge approaches, the SFOBB Toll Plaza, and bridge maintenance facilities. The East Span Project alternatives would continue this pattern of development and therefore would not cumulatively influence land use at the Oakland Touchdown area. The other foreseeable future project in this area is a proposed public park.

The Retrofit Existing Structure Alternative and Replacement Alternatives N-2 and N-6 (Preferred) would not impact existing or proposed land uses at the Oakland Touchdown area, and would accommodate the development of the proposed Gateway Park whereas the alignment of Replacement Alternative S-4 would bisect it and reduce its size by approximately one-half.

The Resource Conservation Area designated in the Oakland General Plan on the north side of the Oakland Touchdown consists of landscaped uplands, sand flats, sand dunes, and tidal marshes. The area would be impacted by Replacement Alternatives N-2 and N-6 (Preferred). Both alternatives would impact a portion of the sand flats that are on the westernmost portion of the Resource Conversation Area. The trend for the Resource Conservation Area is preservation and enhancement. The East Span Project northern replacement alternatives would reduce the total area of sand flats designated as a Resource Conservation Area, reversing the enhancement of the area. No other projects are known that would affect resource conservation areas in Oakland. A cumulative impact is not expected to occur.

Replacement Alternative S-4 would conflict with the proposed Gateway Park. However, a cumulative impact would not be expected to result from the conflict because, although Replacement Alternative S-4 would change the area and configuration of the proposed Gateway Park, both of the uses could be accommodated.

4.15.4 Transportation

Context

The regulatory context for the transportation analysis is the transportation policies and plans of federal, state, and regional agencies that oversee planning, funding and maintenance of transportation facilities crossing the San Francisco Bay. The geographic context for transportation is the Transbay Bay Bridge Corridor, which extends from the 5th Street I-80 vehicular on-ramp to the SFOBB in San Francisco to the distribution structure in Alameda County. The corridor includes proposed connections to the Bay Trail as well as the Transbay Transit Terminal in San Francisco. It also includes the north-south navigation openings beneath the existing SFOBB. The SFOBB is a regional transportation facility and is designated as an Interstate highway. Because there would be no change in the traffic capacity of the facility, the project alternatives would only influence transportation facilities within the Transbay Bay Bridge Corridor.

The Transbay Bay Bridge Corridor connects Alameda, Contra Costa, and San Francisco counties. It has been a transportation corridor since the development of an integrated system of trains and ferries in the late 1800s. The train and ferry system was followed by the SFOBB which was completed in 1936, the BART Transbay Tube in the 1960s, and re-introduction of ferry service connecting San Francisco to Oakland and Alameda in the 1980s. This past trend as a central transportation corridor for the Bay Area is anticipated to continue in the future.

The Transbay Bay Bridge Corridor includes cars, buses, and other high-occupancy vehicles (e.g., carpools and vanpools, BART, and ferries), trucks, motorcycles, boats, and bicycles that use both the Caltrans bike shuttle and BART. Transportation impacts discussed in this section are those which affect the movement of people and goods via these forms of transportation. There is an increasing demand for transportation services in the Transbay Bay Bridge Corridor. A number of actions are being studied to address the need to provide additional transportation capacity in the corridor. The Metropolitan Transportation Commission (MTC) conducted a study of potential new Bay crossings in 1991 and is currently updating it to consider how traffic operations systems, new rail services, and additional bridges crossing Central San Francisco Bay could increase transportation capacity in the corridor to address a continuing increase in demand for multi-modal transportation services.

Other trends are an expanded Bay Area ferry network and increasing demand for transbay bus service. Ferry service in the Transbay Bay Bridge Corridor includes Alameda-San Francisco and Jack London Square-San Francisco routes. A Regional Ferry Plan for the San Francisco Bay Area conducted in 1992 called for a 45 percent increase in ferry service throughout the Bay. Capital improvements to support increased service would include terminal facility upgrades and new high-speed ferries. Sources for additional funding to implement recommended service improvements have not been identified.

AC Transit provides commuter bus service in the Transbay Bay Bridge Corridor. Statistics show that ridership increased from 8,800 to 13,600 between 1996 and 1999. AC Transit conducted a CEQA environmental review of options to expand transbay bus service in 1997 and concluded that there would be no adverse impacts to such an expansion.

Pedestrian facilities are not currently provided in the Transbay Bay Bridge Corridor. Public planning sessions for the East Span Project and MTC-led studies addressing provision of a bicycle/pedestrian path on the SFOBB West Span have identified a desire for bicycle/pedestrian facilities in the Transbay Bay Bridge Corridor.

Foreseeable projects in the Transbay Bay Bridge Corridor include the West Approach Seismic Retrofit, the West Span Seismic Retrofit, the YBI Tunnel Retrofit, the West Viaduct YBI Retrofit, the distribution structure seismic retrofit, reconstruction of the SFOBB Toll Plaza, bicycle/pedestrian improvements on YBI and TI, and planned expansion of the Bay Trail. A redesign or replacement of the Transbay Transit Terminal is planned and AC Transit will install bicycle racks on transbay buses by early 2001. The 1996 Draft Reuse Plan envisions ferry service between San Francisco and Treasure Island.

Impacts Analysis

Vehicular. All build alternatives would maintain existing traffic capacity on the SFOBB and would therefore have minimal impacts on vehicular transportation.

While redevelopment on YBI and TI (see Section 4.15.3 — Land Use) could generate additional transportation demand in the Transbay Bay Bridge Corridor, the 1996 Draft Reuse Plan is based on existing bridge capacity and calls for ferry service to accommodate additional transportation demand to and from YBI and TI. Vehicular traffic from YBI and TI would be adequately accommodated by the current transportation capacity of the bridge and ramps, assuming the 1996 Draft Reuse Plan is implemented as described. Other projects affecting transbay vehicular traffic (e.g., additional bridge crossings) are too speculative to evaluate at this time.

Bicycle and Pedestrian. The Retrofit Existing Structure Alternative would not accommodate bicycles and pedestrians on the East Span, but would be consistent with planning to extend the Bay Trail to the west end of the Oakland Touchdown area. The Retrofit Existing Structure Alternative in combination with planned Bay Trail improvements would have negligible impacts on bicycle and pedestrian traffic within the Transbay Corridor.

All replacement alternatives would improve bicycle and pedestrian access along the east half of the Transbay Bay Bridge Corridor through the addition of a bicycle and pedestrian path. This path would provide a link to the future Bay Trail connection at the Oakland Touchdown area and would support the 1996 Draft Reuse Plan's encouragement of bicycle and pedestrian access and circulation on TI and YBI, assuming CCSF permits pedestrian and bicycle traffic to access YBI from the East Span Project bicycle/pedestrian path. This combination of projects would result in a cumulative expansion of bicycle and pedestrian travel opportunities on the eastern side

of the Transbay Bay Bridge Corridor and a beneficial cumulative impact on bicycle and pedestrian circulation.

Impacts on Transportation During Construction

The potential for cumulative impacts to occur in the Transbay Bay Bridge Corridor exists due to the possible overlap of construction of the East Span Project with the West Approach Seismic Retrofit, the West Span Seismic Retrofit, the YBI Tunnel Retrofit, the West Viaduct Retrofit, the distribution structure seismic retrofit, and the reconstruction of the SFOBB Toll Plaza. Potential construction-period impacts for East Span Project build alternatives are discussed in Section 4.14.2 — Transportation Impacts During Construction. In combination with Port of Oakland traffic, there would be an increase in the number of trucks that would operate on Burma Road and Maritime Street during construction of the East Span Project.

As discussed in the Section 4.14.2 — Transportation Impacts During Construction, the Retrofit Existing Structure Alternative could contribute to construction-period impacts because it would result in disruption to traffic operations on the SFOBB during lane closures. This condition would persist for much of the nearly six-year period to complete this alternative.

As discussed in Section 4.14.2, all replacement alternatives would have minimal peak-period traffic impacts on the SFOBB. These alternatives could contribute to cumulative construction-period effects as a result of off-peak period closures for the diversion of traffic onto the temporary structures and later to a replacement structure.

The Oakland Army Base Reuse Authority (OBRA) reuse plan assesses the potential traffic impacts of its draft reuse plan. The traffic analysis, projected to the year 2010, indicates that the Maritime Street/Burma Road intersection would not meet City of Oakland peak-hour traffic requirements that intersections operate at level of service (LOS) D. With implementation of the draft reuse plan, the Maritime Street/Burma Road intersection would operate at LOS E in the morning peak period and LOS D in the evening peak period. The OBRA draft reuse plan recommends improvements to the morning LOS to meet the City of Oakland's requirements. The OBRA draft reuse plan recommends that the intersection improvements be implemented in 2004.

If East Span Project construction trips on Burma Road occur during morning and evening peak periods, a cumulative traffic impact may result from East Span Project construction vehicle traffic combined with predicted future traffic generated by the implementation of the OBRA reuse plan. Typically, movement of construction vehicles and equipment is timed to avoid peak commute hours, which would reduce the potential for cumulative construction-period traffic impacts to occur in the vicinity of the Port of Oakland. Should OBRA implement intersection improvements recommended for 2004, additional intersection capacity would further reduce the potential for cumulative construction-period traffic impacts to occur in the vicinity of the Port of Oakland.

In combination with other projects in this context area, cumulative transportation impacts, such as increased congestion and travel delays primarily in off-peak travel times, could occur as a result of detours or lane closures occurring simultaneously.

However, Caltrans has successfully implemented consolidated and large-scale public information programs and transportation management plans for projects of the scale of the East Span Project and would do the same for this project. Caltrans is continuing to investigate lane and full bridge closures to transition traffic from the existing bridge to the temporary detours and to the replacement bridge. Caltrans would plan the closures in an effort to simultaneously minimize public inconvenience, facilitate construction, and maximize public safety. The closures would be scheduled to occur during off-peak hours, to the maximum extent possible. Motorists would be informed of construction activities on SFOBB seismic safety projects in the Transbay Corridor in advance through public information programs. Consequently, cumulative traffic impacts would be minimized through the traffic management plan.

4.15.5 Visual Quality

Context

The National Environmental Policy Act requires consideration of visual impacts of proposed actions. For the East Span Project, FHWA's visual quality methodology for roadway projects was used to determine the visual impacts of project alternatives (see Section 4.3 — Visual Impact Analysis). The cumulative impacts on visual quality are analyzed in the local geographic context of YBI and the Oakland Touchdown area. The project analysis presented in Section 4.3 determined that visual impacts of the project would consist of loss of vegetation on YBI and at the Oakland Touchdown area; the project would not result in visual impacts in the larger context of the San Francisco Bay Area. Therefore, the cumulative impacts analysis considers the impacts of the East Span Project in combination with other projects that may alter local visual quality either long-term or during the construction period.

In the local context, past trends in visual quality on YBI have reflected military land uses. The appearance of the island has been greatly modified by the construction of military installations, the SFOBB, and introduction of non-native ornamental vegetation. The Oakland Touchdown area was created to provide for military and transportation uses and this trend continues today. More recent trends have been conversion of portions of the former OARB at the Oakland Touchdown area to industrial uses such as cargo container storage for the Port of Oakland. The existing visual quality of the Oakland Touchdown area is low because the predominant views are of industrial uses (e.g., containerized cargo storage and Caltrans maintenance and toll collection facilities). The vegetation on the south side of the Oakland Touchdown area is generally ruderal herbaceous plants and vegetation on the north side consists mostly of pine trees and ice plant.

Other projects at the local level that could affect the visual quality on YBI include YBI development described in the 1996 Draft Reuse Plan such as new buildings. Vegetation removal to reduce fuel load on YBI proposed by the San Francisco Fire

Department may also affect visual quality. Projects in the Oakland Touchdown area include the proposed Gateway Park and reconstruction of the SFOBB Toll Plaza.

Impacts Analysis

Permanent Local Visual Impacts — Yerba Buena Island. CCSF Fire Department plans designating vegetation removal for fire fuel management were not available for review. Typically, fire fuel management focuses on reducing fuel load by removal of highly flammable trees and clearing vegetation immediately surrounding buildings.

The residential and commercial developments in the CCSF's 1996 Draft Reuse Plan could result in the removal of vegetation. It is speculative to estimate the location or amount of vegetation that would be affected. However, a redevelopment concept shown in the 1996 Draft Reuse Plan indicates preservation of the vegetation along the northeastern shoreline of YBI and the ornamental landscaping in the Senior Officers' Quarters Historic District.

The impacts of the East Span Project, the CCSF Fire Department fuel management, and the 1996 Draft Reuse Plan on vegetation would result in a cumulative visual change and some reduction of visual quality. However, because a revegetation plan for the East Span Project would include replacement of vegetation with mature vegetation as much as possible, long-term impacts to visual quality on YBI are not expected.

Permanent Local Visual Impacts — Oakland Touchdown Area. Other projects planned for the Oakland Touchdown area could result in an increase or decrease in vegetated areas. The proposed Gateway Park is not sufficiently advanced in the planning process to determine the amount and types of vegetation that might be included in the park design but it can be assumed that the park would have both landscaping and open space. Design concepts for the SFOBB Toll Plaza reconstruction are not sufficiently developed to determine impacts to pine trees near the existing facility, but this plan would probably include new landscaping. The City of Oakland's plans for the eastern portion of the Oakland Touchdown area are not yet known; however, it is reasonable to assume that both open space and landscaping would be features of future redevelopment.

Based on available information concerning projects at the Oakland Touchdown and the inclusion of a master planting plan for the SFOBB replacement alternatives, it is expected that the long-term cumulative impacts on visual quality due to changes in the amount of vegetation would be beneficial.

Construction-Period Impacts to Viewsheds at Yerba Buena Island and the Oakland Touchdown Area. In addition to clearing and grubbing operations, all build alternatives would require construction activities involving the use of barges, heavy equipment, stockpiles of soils and materials, and other visual signs of construction. Selected views may be modified temporarily during construction because of the heavy equipment and removal of portions of woodland areas.

Visual impacts of development on YBI and TI envisioned in the 1996 Draft Reuse Plan would not occur in the same timeframe as construction of the East Span Project (see Section 4.1.5 — Community Impacts, Development Trends) and therefore the East Span Project would not contribute to local cumulative temporary visual impacts.

Redevelopment planning for the Oakland Army Base must be completed prior to initiating major construction projects on the Oakland Touchdown area. Although the timing of construction is subject to a number of variables, including regulatory and market conditions, it is likely that construction within the area would occur during the seven year construction period for the SFOBB East Span Project. Consequently, motorists are likely to view construction activities associated with former Oakland Army Base redevelopment in addition to construction activities associated with construction of the SFOBB East Span Project. Due to the combined construction activities at the Oakland Touchdown area, there would be a temporary construction-period cumulative impact on visual quality.

4.15.6 Air Quality

Context

From the regulatory perspective, transportation projects, including the East Span Project, are determined to be consistent with planning for air quality if they have been included in the regional air quality emissions analysis conducted by MTC and the Bay Area Air Quality Management District for the RTP and TIP and approved by the U.S. Environmental Protection Agency (see Section 3.4.1 — Regulatory Context for a discussion of conformity regulations). The geographic context for the analysis is the San Francisco Bay Area Basin, which is under the jurisdiction of the Bay Area Air Quality Management District. Other projects considered in the analysis are those in the Transbay Bay Bridge Corridor (see Section 4.15.4 — Transportation), Port of Oakland construction activities, and other transportation projects in the region identified in the RTP and TIP.

Since the federal Clean Air Act was passed in 1970, and amended in 1977 and 1990, air quality in the Bay Area has improved. Emissions levels and ambient concentrations for most pollutants are going down in the San Francisco Bay Area Air Basin despite increases in population and vehicle miles traveled. The one pollutant that has shown an increase over the last 15 years is particulate matter. This increase is due to a growth in area-wide sources, primarily fugitive dust sources. However, smaller particulate matter (PM_{10}) concentrations, for the most part caused by combustion, are decreasing as a result of emission controls.

Implementation of the Clean Air Act Amendments of 1990, which includes stricter stationary and mobile source emission standards and controls, has contributed substantially to the decrease in air pollutant emissions. The implementation of even stricter emission controls in the future is expected to result in further improvements in air quality as stated in the 1999 California Almanac of Emissions and Air Quality issued by the California Air Resources Board.

Impacts Analysis

Air Quality Conformity. As discussed in Section 4.4 — Air Quality, there would not be a change in pollutant emissions resulting from operation of any of the build alternatives. In addition, FHWA has determined that the East Span Project is in conformance with the State Implementation Plan (SIP). (See Section 4.4.3 — Air Quality Conformity). Therefore, this project would not contribute to long-term air quality impacts.

Construction-Period Impacts. Construction-related air quality impacts resulting from this and other projects in the San Francisco Bay Area Air Basin including local projects in the Transbay Bay Bridge Corridor (see Section 4.15.4 — Transportation) and Port of Oakland construction activities could, depending on construction schedules, result in short-term cumulative air quality impacts within the Transbay Bay Bridge Corridor. Construction-period air quality impacts would include internal combustion engine emissions from construction equipment, dust generated by mechanical disturbance, and wind-blown dust from exposed soil. The pollutant usually generated in the largest amount during construction is particulate matter.

Projects that may be under construction simultaneously with the East Span Project include some of the other SFOBB improvements described in Section 1.3.6 — Other SFOBB Seismic Safety Projects. The West Approach Seismic Replacement would require structure dismantling and earthmoving activities that would cause temporary dust and particulate emissions.

Port of Oakland construction activities may also overlap with the East Span Project and be undertaken beginning in 2002 and continuing to the proposed buildout year, 2012. Construction activities could include demolition or rehabilitation of existing structures, dredging, and grading and paving of laydown areas which would increase air pollutant emissions.

The potential for cumulative impacts to occur would be minimized through inclusion of standard specifications employed by contractors of all projects, including the East Span Project (see Section 4.14.4 — Construction Period Air Quality for a listing of standard specifications).

4.15.7 Noise and Vibration

Context

The regulatory framework for noise assessments consists of FHWA's Procedures for Abatement of Highway Traffic Noise and Construction Noise. The project-specific noise analysis is cumulative in approach because it uses projected future traffic data added to ambient noise to assess combined future noise (with and without project noise levels). Impacts are in terms of anticipated noise levels at land uses in proximity to the proposed project.

There is no regulatory guidance for assessment of vibration impacts of transportation projects (see Section 4.14.5 — Construction Period Noise and Vibration for a discussion of vibration impact assessment methodology used for the East Span

Project). No long-term or construction-period cumulative vibration impacts would result from East Span Project alternatives.

For the East Span Project, the geographic context includes receptors on YBI, TI, and the Oakland Touchdown area at which noise levels could change as a result of the project. Land uses and receptors are discussed in Section 3.5.2 — Land Uses and Noise- and Vibration-sensitive Receptors. Past and present land use trends within the project limits indicate a mixture of transportation, industrial, and institutional uses that contribute to a noise environment in which noise-sensitive land uses (e.g., the BEQ in the USCG facility) have in the past and currently experience noise levels at or exceeding FHWA's noise abatement criteria (see Section 3.5.3 — Noise Abatement Criteria and Analysis Guidelines). Future land uses on YBI and TI are expected to generate noise levels similar to existing conditions. The East Span would continue to be a major noise source affecting noise-sensitive land uses in the vicinity of the bridge. Reasonably foreseeable land use patterns at the Oakland Touchdown indicate that transportation and industrial noise sources would continue to predominate. In addition, 5.9 hectares (14.7 acres) at the westernmost end of the former Oakland Army Base property have been designated for a future park.

Other projects that could contribute to cumulative noise impacts include construction projects on YBI related to development scenarios outlined in the 1996 Draft Reuse Plan.

Impacts Analysis

Permanent Impacts. The Retrofit Existing Structure Alternative would not change existing noise levels. The replacement alternatives would reduce noise levels at many locations because of the use of certain types of road surface and construction materials and the single-deck bridge design (see Section 4.5 — Noise and Vibration).

Construction-Period Noise Impacts.

Based on the CCSF's 1996 Draft Reuse Plan, redevelopment on YBI would occur after the East Span Project is completed. The Clipper Cove marina expansion could generate noise from pile driving and construction of new marina buildings. However, construction of the Clipper Cove expansion (which will commence on completion of environmental reviews and approvals) would not contribute to noise impacts to the land uses on YBI that would be impacted by the East Span Project alternatives because of the distance between the two construction sites. At distances greater than 480 meters (1,580 feet) sound attenuation would typically result in noise levels from construction activities that are not be distinguishable from existing noise levels. (See Section 4.14.5 — Construction-period Noise and Vibration for a discussion of construction noise attenuation over distance). Therefore, no cumulative impact is expected to result.

The City of Oakland's plans for the Oakland Touchdown area and Caltrans' reconstruction concepts for the SFOBB Toll Plaza have not been developed to a stage that would allow estimation of the type of construction activity or the timeline. These projects would require construction activities such as pile driving, excavation, and other noise generating activities. Should these projects be undertaken simultaneously with East Span Project construction at the Oakland Touchdown, combined noise levels

could result in an increase in noise levels at the Oakland Touchdown area. There are no noise-sensitive land uses at the Oakland Touchdown area. The planned Gateway Park is a reasonably foreseeable action, but would not be constructed until the East Span Project construction is completed. Therefore, no noise-sensitive land uses would experience construction-period cumulative impacts

4.15.8 Hazardous Wastes

Context

The regulatory context for determining the environmental impacts of disturbance or release of contamination or hazardous wastes are federal, state, and local codes, regulations and guidance directing hazardous waste remediation, and the transport, storage and disposal of hazardous wastes (see Section 3.6.1 — Hazardous Wastes, Legal and Regulatory Requirements).

The geographic context is the eastern portion of YBI and the Oakland Touchdown area; ground disturbance related to construction projects in these areas could result in exposure of workers or nearby residents to hazardous wastes. Past and current land uses are discussed in Section 3.6.4 — Hazardous Wastes, Historical Information Update and Site Reconnaissance and Section 3.6.5 — Hazardous Wastes, Potential Sources of Contamination.

Past trends that may have contributed to the deposition of hazardous wastes on YBI include operation of military facilities and the SFOBB. At the Oakland Touchdown area, operation of the Port of Oakland, former Oakland Army Base, EBMUD treatment and outfall facilities, and the bridge and Caltrans maintenance facilities have contributed to the presence of hazardous wastes.

Foreseeable trends are decreasing deposition of hazardous wastes due to regulations controlling the use and disposal of hazardous wastes and materials. Future actions that could contribute to exposure of workers or residents to hazardous wastes are construction projects on YBI that may be undertaken to implement the CCSF's 1996 Draft Reuse Plan and construction of the planned Gateway Park at the Oakland Touchdown area.

The quality of sediments in the Bay in terms of presence or absence of contaminants is addressed in Section 4.15.10 — Water Quality.

Impacts Analysis

Permanent Impacts. The Retrofit Existing Structure Alternative and Replacement Alternatives N-2, N-6 (Preferred), and S-4 would not result in deposition of hazardous wastes and would therefore not contribute to cumulative impacts (see Section 4.6.1 — Hazardous Wastes, Summary and Comparison of Alternatives). Remediation of hazardous wastes and/or sites as a result of construction of any of the alternatives combined with redevelopment on YBI and construction of the proposed Gateway Park at the Oakland Touchdown area would cumulatively result in decreased future risk of exposure to hazardous wastes within the project limits because the hazardous wastes would be removed from the area and placed at regulated disposal sites.

Construction-Period Impacts. Construction of the Retrofit Existing Structure Alternative and Replacement Alternatives N-2, N-6 (Preferred), and S-4 would have the potential to encounter contamination and increase the possibility of worker and public exposure to hazardous wastes. Other projects on YBI and at the Oakland Touchdown area could also encounter contamination and expose workers and the public to hazardous wastes. Although multiple projects increase the potential for contamination or exposure, the East Span Project alternatives and other projects on YBI and at the Oakland Touchdown area are currently employing or would use established exposure control procedures and safety plans to guide remediation activities. Therefore, cumulative impacts would be avoided.

4.15.9 Geology, Soils, and Seismicity

Context

The regulatory context for the geology, soils, and seismicity analysis is federal, state, and local laws that establish building and structure safety codes. Compliance with these laws is ensured through the permit review process. The analysis has two geographic contexts; geology and soils impacts are addressed at a local level and seismic safety impacts are addressed at the regional level.

Geology and soils impacts are localized in nature; cumulative impacts would be based on the combined potential of projects to create unstable ground conditions that could result in danger to local populations or loss of resources. Therefore, the geographic context for the geology and soils cumulative impacts assessment is YBI, where unstable geologic conditions exist. The East Span Project would not contribute to potential geologic or soil stability impacts at any other locations (e.g., the Oakland Touchdown area). Projects that may contribute to cumulative impacts are limited to YBI redevelopment as described in the 1996 Draft Reuse Plan.

Past trends of development combined with natural erosion on steep slopes have contributed to unstable slopes on YBI.

The context for the seismicity assessment is the lifeline system of roads and bridges in the Bay Area region that Caltrans has designated to support emergency response. (See Section 1.2.1 — Lifeline Connection for an explanation of the lifeline transportation system.) Caltrans has designated a system of roadways and bridges in the Bay Area region which have designed, constructed or will be constructed to meet lifeline criteria at various locations on I-80 between San Francisco and the Nevada border, I-280, I-680, I-780, Route 24, Route 92, and Route 101.[18] Projects included in the cumulative assessment are seismic retrofit projects in the Transbay Corridor, including the West Approach Seismic Retrofit, the East Span Seismic Retrofit, the West Viaduct Seismic Retrofit, the YBI Tunnel Retrofit, and the distribution structure seismic retrofit.

Trends for seismicity are increasing the seismic safety of existing roads and bridges through seismic retrofit.

[18] Memorandum to District Directors from Transportation Planning Program, "The Statewide List of Lifeline Routes" dated December 19, 1997.

Impacts Analysis

Long-term and construction-period impacts are combined in this section because construction activities on unstable slopes can result in both immediate geologic changes and unstable conditions that can contribute to longer-term geologic impacts.

Impacts to Geology and Soils. The Retrofit Existing Structure Alternative would not change local geologic conditions at YBI and would not contribute to cumulative impacts. The replacement alternatives would place bridge foundations on YBI in areas with steep slopes (i.e., greater than 30 percent). Excavation activities in these areas could destabilize and erode steep slopes. Caltrans would restore and stabilize slopes to minimize impacts from construction.

Unstable slopes above the USCG facilities are subject to slides during heavy rains. The USCG takes actions to stabilize slides. These actions would be expected to continue on slopes not impacted by the temporary detours for the East Span Project. The combination of the East Span Project and the USCG actions would contribute to a cumulative improvement in slope stability on the eastern portion of YBI.

The 1996 Draft Reuse Plan for redevelopment on YBI does not include development on steeply sloping areas; therefore, the East Span Project is the only project anticipated to involve steep (greater than 30 percent) areas. Thus, no cumulative impacts would result.

Seismicity Impacts. The East Span Project build alternatives would have a beneficial impact on seismic safety of the traveling public and no projects are known that would undermine the East Span Project improvements. Therefore, no cumulative impacts would occur.

4.15.10 Water Quality

Context

The regulatory context for the cumulative water quality analysis are federal, state, and regional regulations which address protection and enhancement of the beneficial uses of the water in San Francisco Bay and its tributaries. The geographic context is the Central Bay portion of the San Francisco Bay basin, which is described in the San Francisco Bay Regional Water Quality Control Board (RWQCB) Basin Plan.

The Basin Plan sets forth water quality objectives to protect and enhance the beneficial uses of the Bay and its tributaries. One of the mechanisms used by the RWQCB to maintain and/or attain the water quality objectives is to stipulate the objectives of the Basin Plan in National Pollutant Discharge Elimination System (NPDES) permits issued to municipalities and agencies for all projects in the San Francisco Bay basin. The East Span Project and other projects in the Central Bay would be subject to NPDES permitting.

Projects included in the analysis are those within the Central Bay. These projects include local construction activities such as private developments that increase runoff

into the Bay and dredging for navigation purposes at the Ports of Oakland, Richmond, and San Francisco. Planned improvements for the Port of San Francisco include reuse of Piers ½, 3, and 5 and development of the International Cruise Ship Terminal. The Port of San Francisco projects are in the early phases of planning and project descriptions are not developed to the extent that potential water quality impacts can be estimated.

Since the Gold Rush the quality of the Bay's water has historically been adversely affected by a variety of economic activities. Among these activities are hydraulic gold mining, agriculture, grazing, logging, major and minor shipping, ports, marinas, commercial and recreational fishing, waste water discharge, urban activities, and industrial development along the Bay shoreline. Past activities such as wastewater discharges, dumping of wastes, and industrial runoff have created numerous areas of contaminated sediment around the Bay. Common contaminants include metals, pesticides, and toxic organics. Despite these past activities, the San Francisco Bay basin supports diverse and productive environmental resources.

A Regional Monitoring and Assessment Strategy Program evaluates Bay water and sediment at approximately 20 locations throughout the Bay. In general, the results of this monitoring are:

- PCB concentrations exceeded guidelines at all locations;
- Pesticides such as DDT, dieldrin, and chlordane were above water quality objectives at several sampling stations;
- The trace metals copper, nickel, lead, mercury, and chromium were above guidelines at several locations, especially in the North Bay;
- No toxicity to aquatic organisms due to water quality was found; and
- Sediment toxicity was widespread, even though only nickel concentrations exceeded guidelines.

In the Central Bay, where the East Span Project is located, water quality data from regional monitoring and the Caltrans monitoring program indicate that most of the water quality objectives in the Basin Plan are being met. This indicates a trend of water quality improvement in the Central Bay, although water quality objectives for the entire Bay are not being met.

Impacts Analysis

Permanent Impacts. The Retrofit Existing Structure Alternative would not impact the existing runoff level of the SFOBB into the Bay.

As discussed in Section 4.8.1 — Surface Water Quality, the replacement alternatives have features that would improve the quality of storm water runoff. There is an overall improvement in the type of materials such as concrete used in the replacement alternatives compared with the existing East Span. A replacement structure would be a predominately concrete structure that would have limited exposed steel, which reduces the need for painting and paint removal. Painting would occur once every 10 to 15 years with a non-lead paint. The elimination of lead-paint removal and painting on a replacement structure should provide a long-term reduction in adverse water quality

associated with the existing structure. Other design features of the replacement bridge such as standard shoulders, standard lane widths, and increased sight distances would all contribute to improved water quality of bridge run-off by improving safety and traffic flow. Overall water quality of bridge run-off is expected to improve; therefore, the replacement alternatives would not contribute to cumulative adverse impacts on Bay water quality and in fact would have beneficial impacts.

From a cumulative perspective, the RWQCB will continue to permit projects in a manner intended to meet the objectives outlined in the Basin Plan, resulting in improved water quality in the San Francisco Bay.

Construction-Period Impacts. Construction activities for the build alternatives would result in an increase in turbidity containing pollutants due to dredging, pile driving, propeller wash from tugboats/barges, and mud boils. In combination with in-water construction activities for dredging for projects at the Ports of Oakland and Richmond (channel deepenings and improvements), cumulative impacts to water quality could occur as a result of increased turbidity. However, mitigation measures, detailed in Section 4.14.7 — Temporary Impacts During Construction Activities, Water Resources and Water Quality, would minimize turbidity and sediment mobilization to the greatest extent possible.

4.15.11 Natural Resources — Bay Fill

Context

The regulatory context for the Bay fill cumulative impacts analysis includes state laws regarding fill in San Francisco Bay (see Section 4.9.1 — Natural Resources, Placement of Fill in the San Francisco Bay, for a definition of fill and discussion of calculation of fill quantities). This cumulative impacts analysis uses the San Francisco Bay Conservation and Development Commission's (BCDC's) definition of fill because BCDC has the most comprehensive policies on placing fill in the Bay. BCDC administers the McAteer-Petris Act and the San Francisco Bay Plan, which governs the manner and purpose of filling San Francisco Bay and limits such fill to water-oriented uses such as improving public access or shoreline appearance. BCDC issues permits for solid, pile-supported, floating, cantilevered, and high-level suspended fill placed bayward of the mean high tide line or the +1.5-meter (+5.0-foot) contour mean sea level where marshlands are present. The cumulative impact assessment considers the impact of the East Span Project and other projects on the surface area of San Francisco Bay.
The geographic context for the Bay fill cumulative impacts analysis is Central San Francisco Bay. San Francisco Bay has been divided into subregions in the planning documents of several regulatory agencies and organizations including the San Francisco Bay Area Wetlands Ecosystem Goals Project (Goals Project) and BCDC's Bay Plan. The Central Bay subregion includes the main body of San Francisco Bay and extends along the western shore from Point San Pedro in Marin County to Coyote Point in San Mateo County and along the eastern shore from approximately the Emeryville Crescent to San Leandro Marina in Alameda County.

In the last 200 years filling and diking have reduced the Bay from its historic size of 1,761 square kilometers (680 square miles) to approximately 1,114 square kilometers

(430 square miles). BCDC was established in 1965 to limit indiscriminate filling of San Francisco Bay. Since that time the trend of filling the Bay has been reversed. In 1999, BCDC approved projects that will result in a net increase of 105 hectares (258 acres) of Bay surface area. This increase in the size of the Bay's surface area has been a consistent trend for the past several years.

BCDC's annual report provides data (new Bay surface area minus new Bay fill area) on Bay fill trends for the entire Bay. The data were analyzed to assess the East Span Project's cumulative impacts on Bay fill. Between 1970 and 1999, the net increase in Bay surface area was approximately 701 hectares (1,731 acres). Past projects included in these figures are the Port of San Francisco's enhancements at and near the Ferry Building; the commercial fishing harbor near Hyde Street Pier; Pier 39 Limited Partnership; Port of San Francisco's Forbes Island Project; and the Westbound Carquinez Bridge Replacement Project.

Fill types included in the cumulative impacts analysis for the East Span Project include placement of pile-supported fill for piles and pile caps; solid fill for the westbound roadway; high-level suspended fill for the bridge decks; and temporary pile-supported fill for access trestles and docks required to construct projects within the Bay. High-level suspended fill from bridges crossing the Bay is included in the analysis because such fill is regulated by BCDC. However, this type of fill generally does not cause permanent shading or result in other environmental impacts to the Bay because of its substantial height above the surface of the Bay.

Projects included in the cumulative impacts analysis are within Central San Francisco Bay and involve fill in the Bay. These projects are the San Mateo-Hayward Bridge Trestle Widening Project; Port of San Francisco Pier 1 Enhancements; the San Francisco International Airport Runway Reconfiguration Project; Port of Oakland's Harbor Navigation Improvement (-50-foot) Project; and the Port of Oakland Berth 55-58 Project. Other Port of San Francisco projects, such as the International Cruise Ship Terminal and redevelopment of Piers ½, 3, and 5 are in the planning stages; Bay fill associated with these projects cannot yet be estimated.

Impacts Analysis

The methodology for the fill impacts analysis considers the permanent change in the surface area of the Bay. Temporary fill associated with projects is also regulated by BCDC but is not included in the cumulative impacts analysis because temporary fill does not contribute to long-term trends for change in the size of San Francisco Bay. (See Section 4.14.8 — Temporary Impacts During Construction Activities, Natural Resources, for calculation of temporary fill quantities.) All build alternatives would add fill in San Francisco Bay as defined by BCDC.

The Retrofit Existing Structure Alternative would increase the amount of solid and pile-supported fill but would not increase the amount of high-level suspended and cantilevered fill since the fill would be placed within the footprint of the existing bridge. Solid and pile-supported fill required to retrofit the existing East Span would be added under the deck area of the existing East Span (see Section 4.9.1 — Placement of Fill in San Francisco Bay, for a discussion of BCDC regulated fill).

Replacement alternatives would increase the amount of pile-supported and solid fill by adding new piles and pile caps and constructing the westbound roadway; they w1ould also increase the amount of high-level suspended and cantilevered fill by replacing the existing double-deck East Span with two parallel bridge decks. The resulting decrease in Bay surface area would be approximately 18 hectares (45 acres) for Replacement Alternative N-2, approximately 19 hectares (47 acres) for Replacement Alternative N-6, and approximately 17 hectares (43 acres) for Replacement Alternative S-4 (see Section 4.9.1 — Placement of Fill in San Francisco Bay for a discussion of the BCDC regulated fill impacts of the replacement alternatives).

Table 4.15-1 summarizes the available information about the area of Bay fill for other recent and planned projects included in the cumulative impacts analysis.

Combined with the East Span Project replacement alternatives, these projects would result in a net decrease in the surface area of the Bay. This is largely from the high-level suspended fill associated with the East Span Project which generally does not adversely impact the Bay. Nevertheless this could be considered inconsistent with the McAteer-Petris Act and the Bay Plan policies to minimize fill in the Bay and regional efforts to increase the size of San Francisco Bay through fill removal and habitat restoration. A cumulative impact would result from the combined actions.

The East Span Project and each of the recent and planned projects listed in Table 4.15-1 would have mitigation measures. that if successfully implemented and if high-level suspended fill is excluded from the impacts analysis, would result in a net increase in Bay surface area.

Table 4.15-1 Bay Surface Area Fill Summary

Project	Change in San Francisco Bay Surface Area in Hectares (Acres)
East Span Project Replacement Alternatives	17 to 19 hectares (43 to 47 acres) decrease in surface area of the Bay
San Mateo-Hayward Bridge Trestle Widening Project	0.02 hectare (0.04 acre) decrease in surface area of the Bay
Port of San Francisco Pier 1 Enhancements	0.09 hectare (0.22 acre) decrease in surface area of the Bay
San Francisco International Airport Runway Reconfiguration Project	607 hectares (1,500 acres) decrease in surface area of the Bay
Port of Oakland, Oakland Harbor Navigation Improvement (-50 foot) Project	10.9 hectares (27 acres) decrease in surface area of the Bay
Port of Oakland Berth 55-58 Project	4.4 hectares (11 acres) increase in surface area of the Bay

Source: Caltrans, January 2001.

4.15.12 Natural Resources — Special Aquatic Sites

Context

The regulatory context for the cumulative impacts analysis of special aquatic sites is Section 404 of the Clean Water Act. The ACOE regulates fill in special aquatic sites (wetlands, eelgrass, and sand flats) in Waters of the United States. The ACOE has a no-net-loss policy that requires each project to avoid and minimize impacts to special aquatic sites and to mitigate for unavoidable impacts to special aquatic sites. The McAteer-Petris Act and the San Francisco Bay Plan administered by BCDC also regulate fill in San Francisco Bay including special aquatic sites. However, the Section 404 regulations administered by the ACOE are used in this cumulative impacts analysis because their regulations are more comprehensive than BCDC policies in terms of special aquatic sites. Mitigation for unavoidable impacts to special aquatic sites and success criteria are developed in coordination with the ACOE, RWQCB, USFWS, EPA, BCDC, and CDFG.

The geographic context for the special aquatic sites cumulative impacts analysis is Central San Francisco Bay. San Francisco Bay has been divided into subregions in the planning documents of several regulatory agencies and organizations including the San Francisco Bay Area Wetlands Ecosystem Goals Project (Goals Project) and BCDC's Bay Plan as described above.

The trend in the last 200 years has been the loss of special aquatic sites due to diking and filling for agriculture and development. Approximately 93 percent of Central San Francisco Bay's original 5,447 hectares (13,461 acres) of tidal marshes have been lost (Baylands Ecosystem Habitat Goals, 2000). The approximately 383 hectares (947 acres) of remaining wetlands are threatened by development, erosion, pollution, and sea level rise (USGS and Chavez, et al. 1995). In addition, watershed nutrient and sediment loading from the Delta as well as Bay dredging and filling have affected eelgrass although recent data suggest a possible expansion of eelgrass habitat in the Central Bay since 1987 (Merkel and Associates, unpublished data). Factors affecting wetlands and eelgrass have also contributed to the loss of tidal flats. Approximately 70 percent of San Francisco Bay's original 5,476 hectares (13,532 acres) of tidal flats have been lost (Baylands Ecosystem Habitat Goals, 2000). Tidal flats, including the large grain sand flats found within the East Span Project limits, have been created in the Bay by millennia of natural accretion of sediments.

The methodology for this assessment uses the Goals Project, information concerning upland wetland reuse projects identified during development of the Dredged Material Management Plan (See Appendix M), and consultation with ACOE, RWQCB, BCDC, EPA, USFWS, and CDFG. This qualitative approach was employed absent a database of San Francisco Bay wetland impacts or Section 404 applications.

Impacts Analysis

Because a database of past, current, and reasonably foreseeable future projects in the Central Bay that would impact special aquatic sites is not available, it is not possible to specifically measure the cumulative impacts to existing special aquatic sites.

Accordingly, impacts have been estimated in the context of regional planning for the enhancement and restoration of special aquatic sites.

The Retrofit Existing Structure Alternative would not impact any special aquatic sites.

The replacement alternatives would have permanent impacts to sand flats, eelgrass beds, and non-tidal wetlands (see Section 4.9.2 — Special Aquatic Sites). The total areas impacted are summarized in Table 4.15-2.

Table 4.15-2 Summary of Replacement Alternative Permanent Impacts to Special Aquatic Sites

Special Aquatic Sites	Replacement Alternative N-2	Replacement Alternative N-6	Replacement Alternative S-4
Non-tidal Wetland	0.00	0.00	0.05 hectare (0.12 acre)
Sand Flats	1.36 hectares (3.36 acres)	1.36 hectares (3.36 acres)	0.01 hectare (0.03 acre)
Eelgrass	0.22 hectare (0.55 acre)	0.22 hectare (0.55 acre)	0.15 hectare (0.37 acre)
TOTAL	1.58 hectares (3.91 acres)	1.58 hectares (3.91 acres)	0.21 hectare (0.52 acre)

Although a comprehensive database of potential impacts to wetlands is not available, two projects in planning stages that would affect Central Bay wetlands or other special aquatic sites are the San Francisco International Airport Runway Reconfiguration Project and the Port of Oakland's port and airport expansion. The San Francisco International Airport Runway Reconfiguration Project could fill approximately 607 hectares (1,500 acres) of Bay surface area to add new runways. It is not known what portions of the total area are tidal flats or shallow Bay habitats that may be special aquatic sites as defined by Section 404 of the Clean Water Act. The Port of Oakland's airport expansion would fill approximately 2.8 hectares (7 acres) of wetlands. The Port of Oakland's dredging project would impact 0.08 hectare (0.2 acre) of eelgrass but would add approximately 6 hectares (15 acres) of shallow water eelgrass habitat as part of the Middle Harbor Enhancement Area.

Review of ACOE permit applications for work in Central San Francisco Bay for the years 1999 and 2000 documented two projects that impacted Central San Francisco Bay wetlands. The Eden Landing Ecological Reserve tidal marsh restoration project will restore 230 hectares (570 acres) of tidal marsh. Small areas of non-tidal wetlands within the Eden Landing parcel will be replaced with tidal marsh wetlands. The second project, a roadway expansion project in San Mateo County, will have permanent impacts to 0.27 hectare (0.68 acre) of wetlands. Impacts caused by the roadway expansion project will be mitigated through the creation of 0.53 hectare (1.3 acres) of wetlands. Combined, these two projects will result in the net addition of 230 hectares (570 acres) of restored tidal marsh in Central San Francisco Bay.

Caltrans has coordinated with federal and state resource agencies to develop mitigation measures to offset project impacts to special aquatic sites (the conceptual mitigation plan is described in Section 4.9.6 — Natural Resources, Mitigation). The replacement alternatives would impact up to 1.58 hectares (3.91 acres) of special aquatic sites (see Table 4.15-2). Proposed mitigation for impacts to special aquatic sites includes the on-site restoration of portions of the sand flats and eelgrass beds and off-site creation of a tidal marsh ecosystem. The out-of-kind mitigation concepts are designed to replace the functions and values of the sand flats and eelgrass beds, to the extent possible, through creation of a tidal marsh ecosystem consistent with the objectives of the Baylands Habitat Ecosystem Goals Project. The East Span Project would contribute to a cumulative impact on existing special aquatic sites, but would replace the special aquatic sites at a 3:1 ratio.

The East Span Project in combination with known projects that may impact special aquatic sites would contribute to a cumulative loss of special aquatic sites. However, each project that impacts special aquatic sites must comply with federal Clean Water Act Section 404 requirements implemented by the ACOE, which has a policy of no-net-loss of special aquatic sites. The conceptual mitigation plan for the East Span Project would result in a net increase in the total acres of special aquatic sites in San Francisco Bay. Combined with mitigation to ensure no-net-loss for other recent projects impacting wetlands, in addition to recent tidal marsh restoration projects such as the Eden Landing Ecological Reserve, a net increase in special aquatic sites in Central San Francisco Bay would occur. This net increase would contribute to a reversal of the historic trend for loss of special aquatic sites in San Francisco Bay.

4.15.13 Natural Resources — Special Status Species

Context

The regulatory context for the special status species cumulative impacts analysis is the federal and state laws which protect species. The federal and California Endangered Species Acts provide protection for species listed as rare, threatened, or endangered. Avian species are protected by the federal Migratory Bird Treaty Act, marine mammals are protected by the Marine Mammal Protection Act, and fish species protected under the Magnuson-Stevens Act. Species that may be impacted by the East Span Project are migratory birds and shorebirds, American peregrine falcon, double-crested cormorant, Pacific herring, Chinook salmon, steelhead, green sturgeon, longfin smelt, harbor seal, California sea lion, and gray whale.

The overall geographic context for the special status species cumulative analysis is San Francisco Bay (including San Pablo Bay) and marine and shoreline habitats. Geographic contexts vary by type of species. The geographic context for avian species consists of roosting sites in the San Francisco Bay Area. The geographic context for fish is Central San Francisco Bay and the geographic context for marine mammals (harbor seals) are the haul-out sites in Central San Francisco Bay. These geographic limits are further described in the sections below.

Past trends affecting aquatic habitat for fish and marine mammals are water quality degradation discussed in Section 4.15.10 — Water Quality and reduction in the area of

San Francisco Bay described in Section 4.15.11 — Bay Fill. Trends in water quality and land development have placed pressure on species that have historically used the Bay for foraging and nesting. The result has been increased pressure on remaining habitat to support the special status species that may be present in the East Span Project area.

Past trends in the Bay Area for the protected avian species have been reductions in their numbers due to loss of habitat from development and impacts of chemicals such as DDT, which has caused eggshell thinning and thereby reduced birth rates. In recent years, some avian species have increased in numbers due to the ban on DDT and successful captive breeding. Peregrine falcons have adapted to non-traditional habitats such as tall buildings and bridges; double-crested cormorants have also adapted to non-traditional habitats such as bridges and power lines in water. As a result, both species have shown significant increases in population in recent years. In fact, the falcon was recently removed from the federal endangered species list because of the increase in its numbers.

Other projects considered in the analysis are the Richmond-San Rafael Bridge Retrofit Project, construction activities and dredging for projects at the Port of Oakland, and seismic retrofits of the Carquinez, Benicia-Martinez, Richmond-San Rafael, and Golden Gate bridges.

Impacts Analysis

Permanent Impacts to Avian Species. The Retrofit Existing Structure Alternative would retain existing habitat for the American peregrine falcon and double-crested cormorants. If the peregrine falcons are disturbed during construction such that nesting is adversely impacted, the biologists monitoring them can relocate eggs or chicks. Retrofit of the existing structure would not change roosting habitat for migratory birds and foraging and resting habitats for shorebirds would not be affected.

Replacement Alternatives N-2, N-6 (Preferred), and S-4 would remove habitat for the peregrine falcon. Measures consistent with the Migratory Bird Treaty Act would minimize direct impacts (see Section 4.9.6 — Natural Resources, Mitigation). Peregrine falcons would likely nest on a replacement bridge once construction activities associated with the project are complete. The continuing trend of recovery of the species combined with the potential for the replacement alternatives to provide new nesting habitat indicates that a loss in nesting habitat would not occur as a result of the East Span Project combined with other actions. No other projects have been identified that would remove existing nesting sites. Therefore, cumulative impacts are not expected to occur.

Development in the Bay has resulted in reductions of suitable habitat for the double-crested cormorant, which have caused them to adapt to non-traditional habitats such as the SFOBB and the Richmond-San Rafael Bridge. The colony on the SFOBB is the second largest one in Northern California. The colony at the Farallon Islands marine sanctuary is the largest in Northern California. The replacement alternatives would remove the habitat for the double-crested cormorant colony. Seismic retrofit of the Richmond-San Rafael Bridge, the only other planned project known to have potential to

impact cormorants, is not expected to affect them. The Richmond-San Rafael Bridge seismic retrofit will not remove active nests. Provision of nesting habitat on replacement alternatives or its retention on the Retrofit Existing Structure Alternative on the East Span Project and retention of nesting habitat on the Richmond-San Rafael bridge would avoid cumulative impacts to double-crested cormorants.

Development in the Bay has resulted in reductions of suitable nesting habitat for migratory birds. The Migratory Bird Treaty Act protects nesting activities of migratory birds and does not regulate development that impact habitat for avian species. The replacement alternatives would not restrict nesting activities of migratory birds and therefore would not, in combination with other projects, contribute to long-term cumulative impacts to migratory birds.

Shorebirds use sand flats within the project limits for foraging and resting. As described in Section 4.15.12 — Natural Resources, Special Aquatic Sites, the replacement alternatives would contribute to a cumulative impact to special aquatic sites and therefore a cumulative impact to shorebirds. Special aquatic sites mitigation for the replacement alternatives would contribute to an overall increase in sand flats in Central San Francisco Bay (see Section 4.15.12).

Construction-Period Impacts to Avian Species. Nesting and breeding activities of the peregrine falcon, double-crested cormorants, and other migratory birds on the existing structure could be disrupted by noise and other construction activities related to the build alternatives. Mitigation measures would include monitoring the peregrine falcon during nesting and removing eggs or chicks if monitors determine that the disturbance is adversely affecting nesting activities and prevention of double-crested cormorants and other migratory birds from nesting on the structure (see Section 4.14.8 — Temporary Impacts During Construction Activities, Natural Resources). Under the conditions of the Migratory Bird Treaty Act, a nest cannot be disturbed if nesting activities have begun. Specifications for the Richard-San Rafael Bridge seismic retrofit call for prevention of nesting during retrofit activities but if nesting has begun the nests cannot be disturbed. Because the East Span Project replacement alternatives would dismantle the existing East Span after construction of the Richmond-San Rafael bridge seismic retrofit work is complete, there is no potential for cumulative construction period impacts.

Construction of the replacement alternatives will disturb sand flats at the Oakland Touchdown area used by shorebirds for resting and foraging. In combination with construction activities for the project considered in Section 4.15.12, a reduction in shorebird resting and foraging habitat could occur. This would cause a cumulative impact.

Mitigation for impacts due to temporary disturbance to special aquatic sites is required for all projects will also provide mitigation for temporary disturbance of shorebird resting and foraging habitat (see Section 4.14.8 — Temporary Impacts During Construction Activities, Natural Resources for a discussion of East Span Project impacts to sand flats).

Permanent Impacts to Fish Species. No permanent impacts to fish would result from the build alternatives.

Construction-Period Impacts to Fish Species. Construction activities for the build alternatives could result in an increase in turbidity that could impact migratory fish species including Pacific herring, Chinook salmon, steelhead, green sturgeon, and longfin smelt. In combination with dredging for projects at the Port of Oakland that could be underway during construction of the East Span Project, the potential for cumulative impacts to occur as a result of increased turbidity to these species was assessed. Investigation of sediment transport from East Span Project dredging activities indicates that sedimentation and turbidity impacts are localized and temporary, with suspended material settling rapidly. Analysis indicated a low potential for the East Span Project build alternatives to contribute to sediment increases in the vicinity of the Port of Oakland (see response to Comment 4 of the Port of Oakland's letter responding to the DMMP dated July 21, 1999 in Volume II, Section 2 — DMMP Comments and Responses). Therefore, large areas of increased turbidity would not result from the projects considered in the assessment and cumulative impacts would not occur.

Pile driving for East Span Project build alternatives may have impacts on fish within the immediate vicinity. Impacts on fish from driving large piles in the Bay are not well documented. During the Pile Installation Demonstration Project (PIDP) completed in December of 2000, injury and mortality to small fish were observed within the immediate vicinity of pile driving operations. While the results of the PIDP have not been finalized, preliminary results indicate that use of noise attenuation devices reduces impacts to small fish near pile driving. Caltrans will continue coordinating with NMFS regarding interpretation of the PIDP results. In compliance with NMFS' Biological Opinion, Caltrans would require that sound attenuation measures be included in pile driving specifications for any pile driving during the peak juvenile salmonid outmigration period of January 1 through May 31. Provision of sound attenuation during the peak outmigration period would avoid construction-period cumulative impacts to special status fish and would also benefit other fish species during that period.

Because there is limited information available concerning potential for fish kill due to pile driving in the Bay, cumulative impacts to fish cannot be determined.

Permanent Impacts to Marine Mammals. No long-term impacts to marine mammals would result from the build alternatives.

Construction-Period Impacts to Marine Mammals. Underwater sound pressure levels generated by pile driving for all build alternatives could result in temporary impacts to harbor seals. There are 12 harbor seal haul-out sites and rookeries in the Bay; of those, only eight are used by more than a few animals at a time. Three sites in the Bay regularly host more than 40 harbor seals at any one time. The three closest sites to the project area are YBI, Angel Island, and Castro Rocks near the Richmond-San Rafael Bridge. Surveys at these sites indicate that pupping activities occur at Castro Rocks but do not occur at the YBI haul-out site.

Retrofit of the Richmond-San Rafael Bridge, scheduled for completion by March 2004, could also result in temporary impacts to harbor seals. A mitigation and monitoring plan has been developed to protect them. The plan includes restriction of certain retrofit activities near Castro Rocks to avoid impacts to harbor seals during pupping season, regular monitoring of haul-out sites in the Bay, and collection of data by direct observation, analysis of videotape data, and surface and underwater audio analysis. No other projects in San Francisco Bay, including the seismic retrofit of the Carquinez or Benicia-Martinez Bridges, are anticipated to impact harbor seals because no harbor seal haul-out sites are located in the vicinity of these projects.

Data indicate that harbor seals return to haul-out sites when construction activities cease. The East Span and Richmond-San Rafael Projects do not physically impact the haul-out sites and activities related to these projects that may impact harbor seals would be intermittent (e.g., pile driving, vessel traffic passing haul-out sites, or increased human activity). Because the haul-out sites would not be directly used for construction activities and the activities would be intermittent, cumulative impacts during construction of the East Span Project in combination with the seismic retrofit of the Richmond-San Rafael Bridge are expected to be minimal.

Potential East Span Project impacts to marine mammals were evaluated during the Pile Installation Demonstration Project. The PIDP was completed in December 2000 and data from the project are being analyzed. Initial results indicate no impacts to marine mammals at the YBI haul-out site and minimal impacts to marine mammals at the PIDP site. Once this analysis is complete, a mitigation and monitoring plan would be prepared in coordination with the NMFS to address potential construction-related impacts to harbor seals. Actions to avoid harassment of marine mammals would be implemented during construction.

4.15.14 Other Natural Communities

Context

The regulatory context for assessment of cumulative impacts to terrestrial natural communities is the California Department of Fish and Game's listing of Natural Communities of Special Concern.

Coast live oak woodlands exist along the coastline from Sonoma County to Baja California. Development has resulted in losses of oak woodlands. Apparent problems with regeneration of the species and infectious disease have raised concern for the health of oak woodlands. Oak woodlands are also subject to urbanization, changes in logging practices resulting in increased oak removal to accelerate conifer growth, the expanding wine industry, and livestock grazing.

Past trends since settlement by Europeans have been conversion of oak woodlands, including coast live oak woodlands, to range land. This trend is best documented in inland oak woodlands; from 1945 to 1973, over a million acres of land were cleared to provide rangeland. A general change in the perception of the value of oak woodlands emerged in the 1970s and 1980s. Aesthetic considerations and increased awareness

of the habitat value of the woodlands led to consideration of their protection and enhancement. Subsequent actions have included local and county tree preservation ordinances to address continuing loss of woodlands due to commercial and residential development, logging, and viticulture.

The geographic context for the other natural communities analysis is YBI. Woodlands on YBI are the only coast live oak woodlands within the project limits. Other projects that may contribute to cumulative impacts to coast live oak woodlands in the project limits are the 1996 Draft Reuse Plan and the City of San Francisco Fire Department's fuel load reduction project. The Oakland Touchdown area is not included in the geographic context because it is man-made.

Impacts Analysis

The Retrofit Existing Structure Alternative would not impact coast live oak woodlands. The replacement alternatives would impact coast live oak woodlands by removal of trees due to the realignment of Macalla Road. The trees on YBI would be replaced in-kind and woodland areas would be delineated as environmentally sensitive areas (ESAs) where possible. The master planting plan for YBI would include mitigation and monitoring for the coast live oak woodland impacted by the replacement alternatives.

Other projects on YBI are the 1996 Draft Reuse Plan and the San Francisco Fire Department fuel management program. No plans or schedules are in place to determine if woodlands would be impacted by these activities. Because there is limited information available concerning future uses that may affect coast live oak woodlands, cumulative impacts to the trees cannot be determined. However, mapping of coast live oak woodlands is available to ensure that redevelopment and forest management plans take into account the presence of the woodland, thereby minimizing the potential for cumulative impacts.

4.15.15 Historic Resources: Historic Bridges

Context

The regulatory context for cumulative impacts to cultural resources is the National Historic Preservation Act (NHPA) (see Section 3.10.1 — Historic and Cultural Resources, Regulatory Context). Cultural resources include historic bridges, historic buildings, and archaeological sites. The NHPA establishes the National Register of Historic Places (National Register), which is the nation's list of historic properties significant in American history, architecture, engineering, and archaeology. Section 106 review requires that federal agencies consider project impacts on historic properties listed on or eligible for listing on the National Register. Properties are determined eligible for listing or listed on the National Register at the national, state, and/or local levels of significance.

The geographic context includes major crossings of San Francisco Bay. Existing major crossings of San Francisco Bay are the large engineering structures that are components of the Bay Area transportation network. These major Bay crossings are the Antioch Bridge; the Southern Pacific (Union Pacific) railroad bridge at the eastern end of the Carquinez Strait, located adjacent to the Benicia-Martinez Bridge; the

Benicia-Martinez Bridge; the eastbound and westbound Carquinez Bridges between Crockett and Vallejo; the Golden Gate Bridge; the Richmond-San Rafael Bridge; the San Francisco-Oakland Bay Bridge; the San Mateo-Hayward Bridge; and the Dumbarton Bridge. Of these major crossings, four have been determined eligible or are listed on the National Register. They are the Southern Pacific railroad bridge (Carquinez), the westbound Carquinez Bridge, the Golden Gate Bridge including the Marina and Presidio viaducts, and the San Francisco-Oakland Bay Bridge. These Bay crossings are listed, in the process of being listed, or determined eligible for the National Register at the national level of significance (except for the Carquinez Bridge which was determined eligible at the state level) based on engineering and transportation attributes. Retrofitting and replacement projects are underway or have been completed for these historic structures, except for the Southern Pacific railroad bridge. The retrofits may result in changes to their historic characteristics. Future status of these historic properties is not a factor in determining listing or eligibility for the National Register.

Among these historic San Francisco Bay crossings, the vehicular bridges are being retrofitted or replaced to meet current seismic safety standards. The trends for historic vehicular bridges are either changes to their historic characteristics due to retrofitting or their loss due to their replacement; both retrofitting and replacements provide seismic safety. See Table 4.14-3 below for a list of projects on historic vehicular bridges and see Section 4.15.4 — Transportation for a discussion of other SFOBB projects). Neither major seismic retrofit nor replacement of the Southern Pacific railroad bridge has been proposed. Proposed actions are summarized in Table 4.15-3.

Table 4.15-3 Historic Vehicular Bridges Crossing San Francisco Bay

Structure	Seismic Strategy
Westbound Carquinez Bridge	Removal of historic bridge following construction of replacement bridge
Golden Gate Bridge	Retrofit of main span would have minor impacts to its historic characteristics. Retrofit of the Presidio and Marina viaducts have changed their historic characteristics.
SFOBB West Approach (5th Street to the San Francisco Anchorage at Rincon Hill)	Removal of the historic bridge and construction of a replacement bridge
SFOBB West Span	Retrofit of existing bridge would change its historic characteristics.
SFOBB East Span	Removal of historic bridge following construction of replacement bridge

Source: Caltrans, February 2001.

Impacts Analysis

A cumulative impact to historic San Francisco Bay crossings would result from their replacement or retrofit. Memoranda of Agreement (MOA) pursuant to NHPA for the SFOBB, Carquinez Bridge, and viaducts and main span of the Golden Gate Bridge stipulate measures to document the historic features of the bridges. This

documentation would be implemented partially through a museum exhibit, which would describe the historic context in which they were constructed and operated, and their influences on patterns of history and transportation in the San Francisco Bay Area. Because there are no plans to replace or retrofit the Southern Pacific railroad bridge, it would not contribute to cumulative impacts.

4.15.16 Historic Resources: Historic Buildings

Context

The regulatory context for cumulative impacts to historic buildings is the National Historic Preservation Act (see Section 3.10.1 — Historic and Cultural Resources, Regulatory Context).

The geographic context for historic buildings is comprised of the historic buildings on military bases surrounding San Francisco Bay that have been or are being closed under the Base Realignment and Closure (BRAC) process. The geographic context best represents the types of historic buildings that could be affected by the East Span Project. Naval Station Treasure Island (NSTI) is within the East Span Project limits. Historic buildings at the former NSTI on YBI within the East Span Project limits are the structures in the Senior Officers' Quarters Historic District, Building 10 and the associated garage, Building 267, and Building 262. Historic buildings within the former Oakland Army Base are located outside of the East Span Project limits. The Key Pier Substation, a historic transportation building located within the East Span Project limits, would be affected by the replacement alternatives. (See Section 3.10.3 — Historic and Cultural Resources, Historic Architectural Resources for a description of buildings within the East Span Project limits.)

NEPA environmental reviews have been conducted for BRAC actions at Bay Area military bases. There is a general trend of preservation of historic buildings at the closed bases. Available information on BRAC actions affecting historic buildings is summarized in Table 4.15-4.

Although some historic buildings are being removed as a result of BRAC closures, the general trend is toward preservation of historic buildings at former military bases in the San Francisco Bay Area. The East Span Project alternatives would be consistent with this general trend because the project would not remove historic buildings at former military bases in the San Francisco Bay Area.

The geographic context for historic transportation buildings is the historic buildings in the San Francisco Bay Area. This includes historic structures such as the San Francisco Embarcadero (Ferry Building), railroad depots along the San Francisco peninsula and in the East Bay, and the remaining structures associated with the Key System railroad. The trend for historic transportation buildings is their preservation. Historic railroad depots on the San Francisco peninsula and along the Northwestern Pacific Railroad in Marin and Sonoma Counties have been rehabilitated for transportation use or are being preserved.

Table 4.15-4 Trends in BRAC Closure Impacts to Historic Buildings

Military Installation	Impacts to Historic Buildings
Alameda Naval Air Station	Information not available
Hamilton Army Airfield	Eight buildings within the historic district are likely to be removed.
Hunters Point Naval Ship Yard	No historic buildings expected to be removed. MOA prepared to ensure preservation of buildings in the Commercial Dry Dock Historic District
Mare Island Naval Ship Yard	No historic buildings expected to be removed. MOA prepared to promote preservation of historic buildings.
Naval Air Station Moffett Field	De-established as a military facility and currently managed by NASA. No impacts to historic buildings.
Naval Station Treasure Island	National Register listed and eligible buildings are located on north TI and YBI. An MOA is being developed concerning future treatment of historic buildings. It is anticipated that no historic buildings would be removed.
Former Oakland Army Base	The Northwest and Northeast Historic Districts have been determined eligible for the National Register. Buildings within the historic districts would be removed.
Oakland Fleet Industrial Supply Center	Historic buildings would be removed from the Naval Supply Center, Oakland Historic District, and North Training Wall. MOA developed to record representative sample of structures to be removed.
Point Molate Naval Supply Center	National Register eligible historic resources existing within the base. They are being incorporated into the reuse plan and would be preserved.
Presidio of San Francisco	Restoration and adaptive reuse program for historic buildings is being implemented.

Impacts Analysis

Permanent Impacts. The cumulative impacts analysis for historic buildings considers the impacts of East Span Project build alternatives combined with other actions that may result in removal of historic buildings at closed military bases surrounding the San Francisco Bay or historic transportation buildings in the Bay Area. No historic military or transportation buildings would be removed by the project.

The East Span Project build alternatives would not contribute to a cumulative impact to historic military and transportation buildings because none would be modified or removed as a result of any of the build alternatives.

Construction-Period Impacts. Construction-period cumulative impacts to historic buildings at the BRAC bases considered in the impacts analysis (Naval Station Treasure Island and Oakland Army Base) could occur if construction activities at these locations occur simultaneously. Based on information in the 1996 Draft Reuse Plan, redevelopment work that would affect historic buildings on YBI would not be underway during East Span Project construction (See Section 4.1.5 — Community Impacts, Development Trends).

A construction schedule for the Oakland Army Base reuse plan is not available to use as the basis for evaluating construction-period cumulative impacts. Because the construction zones for the projects are not contiguous, there is no possibility of combined construction-period impacts.

4.15.17 Cultural Resources: Archaeological Resources

Context

The regulatory context for archaeological resources is the NHPA (see Section 3.10.1 — Historic and Cultural Resources, Regulatory Context). Besides the NHPA, the federal Native American Grave Protection and Repatriation Act and California Public Resources Code Sections 5097.98 and 5097.99 concern Native American remains.

The geographic context for the analysis is the perimeter of San Francisco Bay. The perimeter of the Bay was identified as the appropriate geographic context since it is where very large shellmounds, an important type of archaeological site, are located. This site type is not typically found elsewhere in California. In 1909, Nels Nelson of the University of California recorded 425 shellmounds around the margins of the Bay. Of these 425 shellmounds, approximately five are still visible and considered to be fairly intact. In terms of past trends approximately 400 of the shellmounds originally recorded by Nelson have been disturbed, most by leveling for development. At several of these sites, portions of largely intact archaeological deposits are known to remain below contemporary ground levels. It is possible that intact deposits remain below ground in many other locations, but quantifying the number of partially intact shellmounds that remain along the perimeter of the Bay is difficult: many have been covered by development. Identifying remaining deposits usually occurs during construction activities unless pre-construction archaeological investigations take place.

One shellmound, CA-SFr-04/H, has been recorded within the Area of Potential Effect for the East Span Project. The prehistoric component of the site is a contributing element to the site's potential National Register eligibility (see Section 3.10.2 — Historic and Cultural Resources, Archaeological Resources). The portion of CA-SFr-04/H visible at the time of Nelson's 1909 survey has been removed, but the field program conducted in connection with the East Span Project established that it still has intact subsurface deposits.

Impacts Analysis

As discussed in Section 4.10.2 — Cultural Resources, Impacts to Archaeological Resources, the Retrofit Existing Structure Alternative and Replacement Alternatives N-6 (Preferred) and S-4, including the temporary detours for the replacement alternatives,

could affect the prehistoric midden component of site CA-SFr-04/H. Replacement Alternative N-2 would avoid the site.

The removal of a portion of CA-SFr-04/H as a result of the East Span Project has an incremental impact on the preservation of shellmounds on the fringes of the Bay. It is unknown how many other shellmounds with subsurface, intact deposits still exist around the Bay or how many of these could be affected by construction in the reasonably foreseeable future. However, certain recent and reasonably foreseeable projects which could or have already affected shellmounds include the development of an office complex in Emeryville, potential construction of a parking lot in Berkeley, and a planned residential development in South San Francisco. These projects, combined with the East Span Project, would have a cumulative impact.

FHWA, USCG, SHPO, and ACHP have entered into an MOA with Caltrans as a concurring party, committing Caltrans to prepare a treatment plan for pre-construction archaeological data recovery in order to mitigate impacts to CA-SFr-04/H. The development of the treatment plan would involve all parties to the MOA as well as interested Native Americans.

Other projects along the Bay's shores could potentially affect archaeological resources. Such projects are subject to state and/or federal regulatory review under NEPA, NHPA, and/or CEQA. These reviews result in mitigation measures that would minimize any cumulative impacts to archaeological resources and ensure that data from such resources is documented and preserved.

4.15.18 Energy

Context

The regulatory context for the energy analysis is the NEPA mandate to include discussion of energy requirements and conservation measures in NEPA environmental documents (40 CFR 1502.16 (e)). A long-term energy impact assessment is not necessary for the project and thus a cumulative impacts determination is not required. This is because the regulatory context for the energy analysis requires a comparison among project alternatives of the barrels of oil consumed from long-term use of the facility and the East Span Project alternatives do not add traffic capacity compared to the No-Build Alternative. Therefore, long-term energy use is equal among all the project alternatives. There is the potential for the replacement alternatives, which include inside and outside shoulders, to improve traffic operations by reducing the traffic congestion impacts of accidents and breakdowns. The energy consumption benefits of the improved traffic operations of the replacement alternatives is minimal in comparison to the long-term energy consumption of vehicles using the bridge. It is not possible to measure this slight potential energy reduction due to improved traffic operations of adding shoulders because of the lack of predictability of accidents and breakdowns.

The energy analysis for the East Span Project compares the necessary energy to construct the build alternatives (see Section 4.13 — Energy) consistent with NEPA guidance. The geographic context for the construction-period energy analysis is the

United States. The other actions that could contribute to cumulative expenditure of energy during the East Span Project construction period are energy-consuming activities in the United States that would occur during East Span Project construction.

Trends for energy use are improvements to energy efficiency of construction equipment to reduce construction energy demands.

Impacts Analysis

Construction-Period Energy Consumption Impacts. East Span Project build alternatives would consume 3.5 to 6.5 million barrels of oil over the multi-year construction period (see Section 4.13.2 — Energy, Impacts for energy consumption of the build alternatives). This amount is negligible compared to available statistics indicating that U.S. consumption in the late 1990s was approximately 18 million barrels of oil per day. In the context of the U.S. energy market, East Span Project build alternatives have a minimal contribution to cumulative energy consumption measured in barrels of oil per day.

4.15.19 Dredging

Context

The regulatory context for the dredging cumulative impacts analysis is the Long-Term Management Strategy for the Placement of Dredged Materials in the San Francisco Bay Region (LTMS). The LTMS sets policies and addresses the cumulative impacts on in-Bay dredged material disposal. A NEPA environmental impact statement/CEQA programmatic environmental impact report for the LTMS was completed in 1999. This strategy document was cooperatively developed by the EPA, ACOE, State Water Quality Control Board, RWQCB, and BCDC. These agencies have also established an interagency Dredged Material Management office (DMMO) that is responsible for coordinating review of dredging activities and disposal of dredged materials from all projects in San Francisco Bay. Past trends have been in-Bay disposal of dredged materials, for example near Alcatraz Island. This disposal has adversely affected water quality, clarity, and aquatic species. Foreseeable trends, due to implementation of the LTMS, are a decrease in in-Bay disposal of dredge materials.

The geographic context for the cumulative impacts analysis is the San Francisco Bay region, consistent with the LTMS. Large-scale dredging for navigation purposes and to maintain berthing areas has occurred in the Bay for over 100 years. At present, an average of four million cubic meters (six million cubic yards) of sediments must be dredged each year to maintain safe navigation in San Francisco Bay.

The LTMS environmental document takes a regional approach to the impacts of dredging such as loss and degradation of water quality due to increased turbidity. (See Section 4.15.10 — Water Quality for a discussion of the types of cumulative impacts that can result from in-Bay work.)

Impacts Analysis

All East Span Project build alternatives would require the disposal of dredged material as a component of the construction scenario. Estimated volumes of dredging material

and a discussion of dredging activities and impacts are provided in Section 4.14.10 — Construction Excavation and Dredging.

Projects that will generate dredged materials are considered in LTMS estimates. The LTMS annual Low-, Mid-, and High-Range in-Bay dredged material volume estimates for San Francisco Bay (1995-2045) are 2,653,005; 3,486,370; and 4,533,810 cubic meters/year respectively (3,740,000, 4,560,000 and 5,930,000 cubic yards/year). These numbers are estimates of dredged material quantities and do not constitute allowable limits for in-Bay disposal. Conservatively, the Retrofit Existing Structure Alternative would constitute approximately 2.5 percent of the annual LTMS estimates (percentages calculated using annual project dredging volumes as a percentage of Low-Range dredged material volume estimates). All Replacement Alternatives would constitute approximately 16 percent of the annual LTMS volumes.

The LTMS Programmatic EIS/EIR reported the potential cumulative impacts of LTMS action alternatives. Action alternatives included combinations of in-Bay, deep ocean, and upland/wetland reuse strategies for disposal of dredged material. The LTMS cumulative impacts analysis reported potential for increases in air emissions from tugboats and truck trips, increases in volumes of waterborne transportation, changes in land use, and habitat conversion/modification related to upland/wetland reuse. Cumulative benefits of habitat restoration and reduced in-Bay disposal were also identified.

Reuse/disposal options for the dredged materials from the build alternatives are outlined in the East Span Project's Dredged Material Management Plan (DMMP) (see Appendix M). Beneficial reuse/disposal scenarios are proposed for the replacement alternatives, to the extent that upland/wetland reuse sites are available to accept dredged materials consistent with construction schedules and costs. This approach would be consistent with LTMS policies. Reuse/disposal options for the East Span Project are consistent with the trend for reducing the volume of in-Bay disposal of disposal of dredged material.

Based on consultation with DMMO member agencies during preparation of the DMMP, reuse/disposal options are available to receive East Span Project dredged materials that have been determined to be suitable for unconfined aquatic disposal. Placement of East Span Project dredged materials at locations (upland, ocean, or in-Bay) available to receive materials would be consistent with LTMS goals to limit in-Bay placement of dredged materials and would contribute to a beneficial cumulative impact of reducing in-Bay dredged material disposal.

4.16 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The No-Build Alternative would not directly involve the use of resources. The build alternatives would involve the commitment of a range of natural, physical, human, and fiscal resources.

The Retrofit Existing Structure Alternative would require approximately 9.3 square meters (100 square feet) of the Senior Officers' Quarters Historic District in order to expand the footing of Column YB2. The replacement alternatives would require right-of-way on both Yerba Buena Island and the Oakland Touchdown. The land used for the proposed project is considered an irreversible commitment during the time period that the land is used for a transportation facility. It should be noted that land in the vicinity of the existing bridge would become available once the bridge is dismantled.

All of the replacement alternatives would affect habitat areas, special aquatic sites, and vegetation to some extent. Mitigation measures would be implemented, but creation/restoration sites may not be in the project area.

Considerable amounts of fossil fuels, labor, and construction materials (such as cement, aggregate, steel) would be expended. It is estimated that 3.5 million barrels of oil would be used during construction of the Retrofit Existing Structure Alternative and over 6 million barrels of oil for the replacement alternatives. It is forecasted that average annual employment during construction would be 360 people for the Retrofit Existing Structure Alternative and 600 people for the replacement alternatives. Workers are expected to be drawn from the regional labor pool, with specialty trades generating demand from outside the Bay Area.

Additionally, large amounts of labor and natural resources are used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply, and their use would not have an adverse effect upon continued availability of these resources.

The build alternatives would require a substantial expenditure of funds, which would not be retrievable. It is expected that the Retrofit Existing Structure Alternative would cost approximately $0.9 billion and the replacement alternatives would have a cost range of $1.5 to $1.65 billion, depending on final design.

The commitment of these resources is based on the concept that the Bay Area region would benefit from a seismically upgraded vehicular crossing. The benefits of a lifeline vehicular connection outweigh the commitment of these resources.

4.17 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

As described in Section 4.14, the East Span Project would result in temporary construction-related increases in noise, traffic congestion and delays, and air pollutants and would involve impacts to Waters of the U.S. and special aquatic sites (wetlands, sand flats, and eelgrass beds). In addition, the dismantling of the existing East Span represents the loss of a historic structure. The build alternatives may also impact land use patterns on YBI.

These and other short-term environmental impacts (i.e., "uses" of the environment) identified in Section 4.14 would be balanced by achieving improved seismic and traffic safety and the related project needs identified in Chapter 1. Maintaining a lifeline connection for emergency response, commerce, and the movement of goods and people would enhance long-term productivity in the event of an MCE.

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CHAPTER 5
CEQA STATUS AND FINDINGS

The SFOBB East Span Seismic Safety Project is exempt by statute from the requirements of the California Environmental Quality Act (CEQA) under California Streets and Highways Code (CSHC) Section 180.2 and CEQA Section 21080.

Sections 21000 through 21178.1 of the Public Resources Code make up the CEQA statutes. Section 21080 contains a list of projects that are generally identified as statutorily exempt; that is, they are granted exemption from CEQA by the state legislature. These are distinguished from other classes of projects listed in Section 21084 that may be found to be categorically exempt after some review.

CEQA Section 21080, subdivision (b) sets forth the types of activities that are excluded from CEQA, and paragraph (4) of this subdivision specifically includes actions necessary to prevent or mitigate an emergency. According to the CSHC, as amended, the structural modification of an existing highway structure or toll bridge (Section 180.2 [a]) and the replacement of a highway structure or toll bridge within, or immediately adjacent to, an existing right-of-way (Section 180.2 [b]) shall be considered to be activities under subdivision (b), paragraph (4).

In the current project, the Retrofit Existing Structure Alternative meets the definition in Section 180.2 (a) and the replacement alternatives meet the definition in Section 180.2 (b). All project alternatives are considered "specific actions necessary to prevent or mitigate an emergency" and are, therefore, statutorily exempt from CEQA. Some exemptions are complete exemptions from CEQA, and other exemptions apply to only part of CEQA requirements. The exemption of emergency actions is a complete exemption and does not require any environmental review under CEQA.

Appendix H of this FEIS contains the Notice of Exemption, pursuant to CEQA, that was filed with the State Clearinghouse and with the Clerks of the Counties of Alameda and San Francisco in the Fall of 1998. The placement of this notice in the FEIS is for the readers' reference; it does not constitute a new noticing procedure under CEQA, nor does this project require additional noticing under CEQA. This notice was previously published in the DEIS appendices for the readers' reference.

CHAPTER 6
SECTION 4(f) EVALUATION

6.1 INTRODUCTION

6.1.1 Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966, codified in Federal law at 49 U.S.C. §303, declares that "[i]t is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

Section 4(f) specifies that "[t]he Secretary [of Transportation] may approve a transportation program or project...requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of a historic site of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area, refuge, or site) only if –

1) there is no prudent and feasible alternative to using that land; and

2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use."

Section 4(f) further requires consultation with the Department of the Interior and, as appropriate, the involved offices of the Departments of Agriculture (USDA) and Housing and Urban Development (HUD) in developing transportation projects and programs which use lands protected by Section 4(f).

In general, a Section 4(f) "use" occurs with a Department of Transportation-approved project or program when: 1) Section 4(f) land is permanently incorporated into a transportation facility; 2) there is a temporary occupancy of Section 4(f) land that is adverse in terms of the Section 4(f) preservationist purposes as determined by specified criteria (23 CFR §771.135[p][7]); and 3) Section 4(f) land is not incorporated into the transportation project, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired (constructive use). 23 CFR §§771.135(p)(1) and (2).

Consultation with the Department of Agriculture (USDA) would occur whenever a project uses Section 4(f) land from the National Forest System. Consultation with HUD would occur whenever a project uses Section 4(f) land for/on which certain HUD funding had been utilized. Since neither of these conditions applies to the proposed project, consultation with USDA and HUD is not required.

6.1.2 Final Section 4(f) Evaluation

A draft Section 4(f) evaluation was circulated with the Draft Environmental Impact Statement (DEIS) for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project on September 24, 1998. After circulation of the DEIS, Section 4(f) was found to apply to two additional properties. Pursuant to CFR 771.135(m)(2), a separate and supplemental Section 4(f) evaluation was prepared to address these properties:

- The temporary occupancy of land from the Senior Officers' Quarters Historic District, a historic resource eligible for the National Register of Historic Places (NRHP), by the temporary construction detours for the replacement alternatives of the proposed project.

- The use of land from the proposed Gateway Park at the Oakland Touchdown by Replacement Alternative S-4. Gateway Park is a significant regional recreational resource being planned by the East Bay Regional Park District (EBRPD) as a future land use of part of the former Oakland Army Base (OARB) property, per designation by the Oakland Base Reuse Authority (OBRA).

The supplemental draft Section 4(f) evaluation also documented that Radio Beach, owned by the Port of Oakland (Port), is not a Section 4(f) resource and is not protected by the provisions of Section 4(f).

The supplemental draft Section 4(f) evaluation was sent to the Department of the Interior and the following interested agencies and organizations on June 29, 1999:

- Advisory Council on Historic Preservation
- United States Navy
- United States Coast Guard
- United States Army
- Oakland Base Reuse Authority
- Port of Oakland
- East Bay Regional Park District
- California Preservation Foundation
- National Trust for Historic Preservation
- Oakland Landmarks Preservation Advisory Board
- San Francisco Landmarks Preservation Advisory Board
- Treasure Island Reuse Authority
- City of Oakland
- California Department of Parks and Recreation

Comments received on the draft Section 4(f) evaluation are included with the letters commenting on the DEIS; responses to these comments are in Volume II, Section 1, of the FEIS. Comments on the supplemental draft Section 4(f) evaluation are in Volume II, Section 3, of the FEIS. Refer to the Section 4(f) correspondence index at the end of this final Section 4(f) evaluation.

6.1.3 Section 4(f) and Section 106 ("Use" versus "Adverse Effect")

One of the issues addressed in this evaluation concerns the application of Section 4(f) to historic resources. The consideration of historic resources under Section 4(f) differs from their consideration under Section 106 of the National Historic Preservation Act. Section 4(f) applies only to programs and projects undertaken by the U.S. Department of Transportation and only to publicly owned public parks, recreation areas, and wildlife refuges, and to historic sites on or eligible for the NRHP. For protected historic sites, Section 4(f) is triggered by the "use" or occupancy of a historic site by a proposed project. There is also the situation, though rare, in which a project does not actually permanently incorporate land from a historic site, but because of its proximity impacts to the historic site, is determined by the U.S. Department of Transportation to substantially impair the qualities that made the historic site eligible for the NRHP. This is referred to as a "constructive use." In addition, when a temporary occupancy of Section 4(f) land meets specified conditions (23 CFR 771.135[p][7]), the occupancy is considered so minimal that it does not constitute a "use" within the meaning of Section 4(f).

Section 106 is a different requirement that applies to any Federal agency and addresses direct and indirect "effects" of an action on historic properties. Section 106 evaluates "effects" on a historic site, while Section 4(f) protects a historic site from "use" by a project. Therefore, even though there may be an "adverse effect" under Section 106 because of the effects upon the site, the provisions of Section 4(f) are not triggered if the project would not result in an "actual use" (permanent or certain temporary occupancy of land) or a "constructive use" (substantial impairment of the features or attributes which qualified the site for the NRHP).

With regard to archaeological sites, Section 4(f) applies to all archaeological sites on or eligible for inclusion on the NRHP, except those that are important chiefly because of what can be learned by data recovery and have minimal value for preservation in place (23 CFR §771.135[g][2]).

6.2 PROPOSED ACTION — PROJECT NEED AND DESCRIPTION

The proposed project is in San Francisco and Alameda Counties, California (see Figure 2-1 in Appendix A). The project would improve the seismic performance of the East Span of the San Francisco-Oakland Bay Bridge (SFOBB) by retrofitting the existing span or by replacing it with a new structure. The proposed project is limited to the East Span of the SFOBB, between Oakland and Yerba Buena Island (YBI) (see Figure 2-2 in Appendix A); the West Span, between YBI and San Francisco, is already being retrofitted (see Section 1.3.5 — Other SFOBB Seismic Safety Projects for additional information). The following discussion presents the need for the project and the project description.

6.2.1 Need for Project

The existing East Span of the SFOBB must be replaced or retrofitted because:

- It is not expected to withstand a Maximum Credible Earthquake (MCE) on the San Andreas or Hayward faults;
- It does not meet lifeline criteria for providing emergency relief access following an MCE; and
- It does not meet current operations and safety design standards.

Each of these needs is described in greater detail in Chapter 1 of this FEIS.

6.2.2 Description of the East Span Seismic Safety Project

The proposed seismic safety project includes full consideration of five alternatives briefly described below. The alternatives include a No-Build Alternative, a Retrofit Existing Structure Alternative, and three replacement alternatives. (Figure 2-3 in Appendix A shows all the alignments for the replacement alternatives; the No-Build Alternative and the Retrofit Existing Structure Alternative would both be on the alignment of the existing bridge.)

No-Build

This alternative would retain the existing SFOBB East Span. It would retain the existing bridge alignment. Under this alternative, the East Span would not withstand an MCE. As a result, this alternative would not provide a lifeline connection to carry emergency relief access after an MCE. The No-Build Alternative provides a baseline for comparison with the other alternatives. The No-Build Alternative includes the East Span Interim Seismic Retrofit Project as a completed project (see Section 1.3.6 of the FEIS for additional information).

Replacement Alternative N-6 (Preferred Alternative)

Replacement Alternative N-6 is the Preferred Alternative, as set forth in Section 6.2.3, below. It would construct a new bridge north of the existing East Span and dismantle the existing structure. The new structure would withstand an MCE and provide a lifeline connection. The new structure would also meet current roadway and design standards for operations and safety. A new transition structure would separate the double-decked lanes entering and exiting the YBI Tunnel into two parallel structures. The twin structures would follow an alignment to the north of the existing East Span. The structures would reach the Oakland shore along the northern edge of the Oakland Touchdown, where they would conform to the existing traffic lanes to the west of the Toll Plaza. The northerly limit of this alignment has been set to minimize intrusion into portions of the Bay where geologic conditions increase the complexity and cost of constructing bridge columns.

Replacement Alternative N-2

Replacement Alternative N-2 would construct a new bridge north of the existing East Span and dismantle the existing structure. The new structure would withstand an MCE and provide a lifeline connection. The new structure would also meet current roadway and design standards for operations and safety. A new transition structure would separate the double-decked lanes entering and exiting the YBI Tunnel into two parallel structures. The twin structures would closely parallel the existing bridge alignment and reach the Oakland shore along the northern edge of the Oakland Touchdown, where they would conform to the existing traffic lanes to the west of the toll plaza.

Replacement Alternative S-4

Replacement Alternative S-4 would construct a new bridge south of the existing East Span and dismantle the existing structure. The new structure would withstand an MCE and provide a lifeline connection. The new structure would also meet current roadway and design standards for operations and safety. A new transition structure would separate the double-decked lanes entering and exiting the YBI Tunnel into two parallel structures that would turn to the south and then back to the Oakland shore in an alignment to the south of the EBMUD sewer outfall. The parallel structures would reach the Oakland shore to the south of the existing East Span and would conform to the existing traffic lanes to the west of the toll plaza. The alignment would avoid crossing the underground EBMUD sewer outfall within the Bay, but it would cross the outfall on land after reaching the Oakland Touchdown area.

Retrofit Existing Structure

The Retrofit Existing Structure Alternative would also retain the alignment of the existing bridge. Each deck section would also remain the same: five lanes, each about 3.5 meters (11.7 feet) wide, with no roadway shoulders. This cross-section does not meet current roadway standards. This alternative would retrofit the existing SFOBB East Span to prevent collapse following an MCE; however, the bridge would sustain such damage that it would not provide a lifeline route for post-earthquake recovery and it would not reopen shortly after an MCE for car, bus, and truck traffic. Although substantial modifications to the cantilever section are proposed as part of the Retrofit Existing Structure Alternative, it is, nevertheless, anticipated that the cantilever section would experience substantial damage and require extensive reconstruction or replacement following an MCE. If damage is such that reconstruction of the cantilever section is feasible, this may require complete closure of the East Span for six months to one year. If, however, damage were sufficiently severe that replacement becomes necessary, the East Span would be completely closed for a substantially longer period of time.

Temporary Detours on Yerba Buena Island

Temporary detours would be required on YBI to carry traffic during construction of any of the replacement alternatives. The temporary detours would be operational for approximately 2 years. The period from the beginning of construction to the end of dismantling would be approximately 4 years. Their purpose would be to reroute traffic around a portion of the existing bridge on YBI to minimize traffic impacts while allowing dismantling of that portion of the existing bridge on YBI to allow construction and tie-in of a new permanent structure.

Configurations and locations of the temporary detours were evaluated in an effort to avoid or minimize impacts to U.S. Navy and U.S. Coast Guard (USCG) facilities. Configurations were analyzed for construction feasibility, impacts to resources on YBI, and traffic operational impacts. Only one temporary detour remains under consideration; it is referred to as the north-south option. The north-south option would build a westbound temporary structure to the north and an eastbound temporary structure to the south of the existing bridge; this option would be used for all three replacement alternatives. (The foundations of this temporary detour are shown schematically in Figures 6-1, 6-2, and 6-3 while photo simulations of the detour structures are shown in Figures 6-13 and 6-14 in Appendix A.)

Temporary Detours No Longer Under Consideration. Two other temporary detours were previously considered and are no longer under consideration. They include constructing eastbound and westbound temporary detours to the north of the existing bridge (north-only option); and constructing eastbound and westbound temporary detours to the south of the existing bridge (south-only option). The north-only temporary detours would result in traffic safety concerns and additional uses of historic resources. The south-only temporary detours for Replacement Alternatives N-2 and N-6 would result in access concerns as a result of bridge closure for a few weeks. The south-only temporary detour for Replacement Alternative S-4 would result in traffic safety concerns. For these reasons, the north-only and south-only temporary detours are no longer being considered.

6.2.3 Preferred Alternative

Replacement Alternative N-6, described above, is the Preferred Alternative for a number of reasons, including avoidance of Section 4(f) resources. Reasons not related to Section 4(f) resources are listed immediately below. The ways in which Replacement Alternative N-6 avoids Section 4(f) resources are discussed in Sections 6.4 and 6.5 of this final Section 4(f) evaluation.

Replacement Alternative N-6:

- Is consistent with OBRA's designation of part of the OARB property as a proposed park;
- Is consistent with EBRPD's concepts for the proposed Gateway Park, a Section 4(f) resource;
- Minimizes conflicts with the USCG facilities;
- Avoids conflicts with the East Bay Municipal Utility District's facilities and operations;
- Provides easier access to bedrock to construct the main span tower for the replacement bridge;

- Provides improved drivers' views of the San Francisco skyline and panorama of East Bay hills;

- Has the general alignment and design variations of the regionally preferred option as expressed by the Metropolitan Transportation Commission (MTC); and

- Was identified as the Least Environmentally Damaging Practicable Alternative (LEDPA) pursuant to the Clean Water Act, based on consultation with and concurrence from the Army Corps of Engineers and the Environmental Protection Agency (see Appendix F of the FEIS for additional information).

6.3 DESCRIPTION OF SECTION 4(f) RESOURCES USED BY PROJECT ALTERNATIVES

Three Section 4(f) resources would be used by alternatives of the proposed project: the SFOBB and its contributing components; the Senior Officers' Quarters Historic District on YBI; and the proposed Gateway Park at the Oakland Touchdown.

6.3.1 The San Francisco-Oakland Bay Bridge

The East Span of the SFOBB and some of its contributing components would be used by the retrofit alternative and all replacement alternatives of the proposed project.

The Entire San Francisco-Oakland Bay Bridge

The entire SFOBB, both East and West Spans, is 13.2 kilometers (8.2 miles) long from Fifth Street in downtown San Francisco to the SFOBB Toll Plaza in Oakland. It includes various bridge structures and ancillary buildings in San Francisco, on YBI and at the Oakland Touchdown, and it includes a double-deck tunnel on YBI. (Figure 1-1 in Appendix A shows a schematic layout of the entire bridge.) The entire SFOBB was determined eligible for listing on the NRHP in 1983, and as such, it is a historic property protected by the provisions of Section 4(f). It is a toll bridge owned and operated by Caltrans. It crosses San Francisco Bay and links the East Bay with the City and County of San Francisco (CCSF) and the San Francisco Peninsula. The double-deck roadway is a designated Interstate Freeway (Interstate 80) with five vehicle lanes on each deck which together carry 272,000 vehicles per day.

In 1931 the State of California established by law the California Toll Bridge Authority, with power to buy or build bridges and borrow money against their prospective tolls. The SFOBB was designed and constructed for the California Toll Bridge Authority by the San Francisco-Oakland Bay Bridge Division, California Department of Public Works. It opened to traffic in November of 1936 as a primary state highway, maintained by the Division of Highways (which later became Caltrans). The SFOBB is significant as a major work of civil engineering for its role in shaping Bay Area transportation patterns and for its association with the important engineers and architects who designed it.

Historic resources that are listed on the NRHP and resources that are eligible for it are viewed similarly under the provisions of Section 4(f) in that all such resources are protected by Section 4(f). Listing on the NRHP, while conferring a certain distinction,

does not result in additional protections to historic resources under the provisions of Section 4(f).

At the time the SFOBB was first opened in 1936, it held many world records. It was the greatest bridge in the world for its cost, length, quantities of steel and concrete, weight, depth, and number of columns, the size of the bore of its tunnel on YBI, and the versatility of its engineering. Seven of its columns were deeper than any others in the world. New technologies were developed to construct the foundations. The submarine work was the greatest underwater engineering task ever undertaken. The steel for the superstructure was said to constitute the largest steel order ever placed.

The West Span and the East Span of the SFOBB are distinctly different bridge structures linked by the tunnel on YBI. The West Span consists of two double-deck suspension bridges joined to a common central anchorage in the Bay between San Francisco and YBI. The anchorages of one suspension bridge are in San Francisco and at the Center Anchorage (Column W4), while the anchorages for the other suspension bridge are at the Center Anchorage (Column W4) and on YBI. In contrast, the East Span consists of trusses, as discussed below.

The East Span of the SFOBB

The East Bay truss/cantilever span (East Span) of the SFOBB connects YBI to the Toll Plaza area on the Oakland shore (see Figure 2-2 in Appendix A). The East Span and the contributing components adjacent to it comprise a substantial part of the SFOBB historic resource. The East Span consists of a series of steel trusses with a cantilever truss system spanning the main navigation opening near YBI. The east viaduct on YBI is a bridge structure that connects the East Span to the tunnel through the island. The east viaduct and the tunnel are contributing components to the historic resource.

Contributing Components Associated with the East Span

Four buildings associated with the East Span are contributing components of the SFOBB.

On YBI, just east of the tunnel, a small garage and electrical substation are immediately adjacent to the bridge on the north side. The buildings are utilitarian concrete structures. They were built in the late 1930s. They are shown in relation to the replacement alternatives on Figures 6-4, 6-5, and 6-6 in Appendix A.

At the Oakland Touchdown, there are two electrical substations adjacent to the eastern end of the bridge (see Figures 6-7 and 6-8 in Appendix A). They are eligible for the NRHP as contributing components of the SFOBB. One of these, the Caltrans Substation, is a utilitarian concrete structure built in the late 1930s, similar to the substation on YBI. The other structure, the Key Pier Substation, was constructed in 1925-26 as part of the Key System Railway. It is a tall concrete building with a pyramidal roof and skylight. It is associated with the bridge as the substation that provided power to the rail lines that were carried on the lower deck of the bridge until the rail lines were removed in the 1950s. It is also individually eligible for the NRHP at the local level of significance under Criterion A as a rare surviving component of the

historically significant Key System railway, which was an important East Bay transit system in the early 20th century.

6.3.2 The Senior Officers' Quarters Historic District

The Senior Officers' Quarters Historic District would be permanently used by the Retrofit Existing Structure Alternative and temporarily used by all replacement alternatives of the proposed project.

The Senior Officers' Quarters Historic District was identified as a property eligible for the NRHP in a historic architecture survey of YBI and Treasure Island, carried out by the Navy in 1997. The Senior Officers' Quarters Historic District is eligible for the NRHP under Criteria A and C, in the areas of military history and architecture. These criteria may be applied to historic districts as well as individual historic properties; in general terms, a historic district contains a number of historic buildings, structures, or sites that are united historically, culturally, or architecturally, and that as an assemblage meet the NRHP criteria of significance.

The Senior Officers' Quarters Historic District is comprised of Quarters 1 through 7 and three associated garages (Buildings 83, 205, and 230) (see Figures 6-4, 6-5, and 6-6 in Appendix A). The boundary of the District is depicted in Figure 6-12 in Appendix A. The seven residences are all of wood frame construction, with two full floors and dormered attic stories. They were constructed between 1900 and 1903 in the Classical Revival style. Quarters 1, the largest and most elaborate of these, was listed on the NRHP in 1991. Buildings 83 and 230 are garages with second floor living quarters, constructed in 1918 and 1944, respectively. Building 205 is a single-story garage constructed in 1936. The district is significant for its association with the Naval Training Station on YBI and as a distinctive ensemble of Classical Revival residences.

The District Record prepared by the U.S. Navy for the historic district states that "[b]oundaries were determined to include the historic buildings of the area, and the landscape elements that tie them together." The boundaries of this roughly triangular historic district are the road to the west of Quarters 5 and 6, the lower edge of the lawn area to the east, and a line up the hill behind Quarters 1 that encompasses the formal gardens between Quarters 1 and Building 230.

6.3.3 Gateway Park

The Gateway Park would be permanently used by Replacement Alternative S-4.

The proposed Gateway Park is located at the Oakland Touchdown (see Figure 6-9 in Appendix A). It would be developed on land that is part of the former OARB, which is currently involved in the base closure process. The OBRA is the designated local redevelopment authority for the base. OBRA's Reuse Plan designates 5.9 hectares (14.7 acres) at the westernmost portion of the Army Base on the Oakland Touchdown as the site of a proposed public access shoreline park. It further designates the EBRPD as the agency that would develop the park. EBRPD proposes generally passive recreational activities to be developed in the park, including but not limited to viewing the Bay, picnicking, and bicycling.

In a letter commenting on the project Draft Environmental Impact Statement, the Department of the Interior found that "the S-4 Alternative Alignment impacts the envisioned park, and other prudent and feasible alternatives exist to this alternative." Department of the Interior recommended that the matter be pursued in consultation with authorities that may be concerned about potential project impacts to park and recreation resources (see correspondence from the Department of the Interior, December 18, 1998, in Appendix G of the FEIS).

In a meeting held March 11, 1999, the FHWA and Caltrans solicited the views on this proposed park from staff of the EBRPD, the Port, the City of Oakland and the National Park Service (NPS). Each agency described the importance of the proposed Gateway Park as a regionally significant recreational facility, providing a gateway to the East Bay.

In early 1999, the MTC committed to allocate $120,000 to the EBRPD for fiscal year 1999-2000. The purpose of the allocation was for Gateway Park project planning. MTC has stated that the Gateway Park is envisioned as a lush greenway that would anchor the Oakland Touchdown of the SFOBB and transform the nondescript Bay frontage at that location into a natural haven.

The proposed public park is on publicly owned land that has been designated for park development by the OBRA, the designated local redevelopment authority for the OARB. The proposed park has received the support of the local community as well as interested local, regional, state, and federal agencies. EBRPD has taken the responsibility for being the lead agency to further develop and manage the park. The proposed Gateway Park is a Section 4(f) resource.

6.4 USE OF SECTION 4(f) RESOURCES BY PROJECT ALTERNATIVES

6.4.1 East Span of the SFOBB and Its Contributing Components

Potential Section 4(f) uses by the project are discussed below as they relate to the East Span of the SFOBB and its contributing structures. The No-Build Alternative would not use this Section 4(f) resource.

Retrofit Existing Structure Alternative

This alternative would retrofit the existing East Span of the bridge from Oakland to the east tunnel portal on YBI. The work would include the addition of new piles and pile caps at many columns, construction of two new columns at the main span of the cantilever truss, and concrete encasement of several of the existing steel piers. A new edge truss would also be added to the cantilever section, from the base of the lower deck to the bottom of the upper deck. This alternative would not alter the garage and substation on YBI or the substations in Oakland that are contributing components of the bridge. (Figures 6-10 and 6-11 in Appendix A show before and after simulations of the Retrofit Existing Structure Alternative looking at the cantilever section.)

Evaluation of Section 4(f) Use by the Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would result in a Section 4(f) use of this historic bridge, because it would adversely affect the historical integrity of the bridge by altering elements of the bridge's design and materials, both of which contribute to the bridge's status as a NRHP eligible property. For more information about "use" under Section 4(f) and "adverse effect" under Section 106 of the National Historic Preservation Act, see Section 6.1.3.

Replacement Alternatives

All of the replacement alternatives include dismantling of the existing East Span as well as removal of the two contributing buildings (the garage and electrical substation) on YBI. The replacement alternatives would not alter or demolish the Key Pier Substation or the other contributing substation at the Oakland Touchdown.

Evaluation of Section 4(f) Use by the Replacement Alternatives. Dismantling of the existing East Span and removal of two contributing buildings would result in a Section 4(f) use of the historic resource.

6.4.2 Senior Officers' Quarters Historic District

The project's Section 4(f) use of the Senior Officers' Quarters Historic District is discussed below. The No-Build Alternative would not use this Section 4(f) property.

Retrofit Existing Structure Alternative

The Retrofit Existing Alternative would expand the concrete column footings and encase Columns YB2 through YB4 on YBI (in Appendix A, see Figure 6-16; Figure 6-15 shows the existing bridge for comparison). The existing columns are outside the historic district boundary. The concrete blocks of the existing column footings extend above the ground level; the part above ground level is about 2.4 meters (8 feet) wide and about 2.7 meters (9 feet) long; the tops of the column footings vary in height above ground level. At Column YB2, the column footing extends about 3 meters (10 feet) above the ground level. Expanding the footing of Column YB2 would incorporate land from the historic district into the transportation facility by extending the concrete block of the footing into the historic district boundary. The above-ground portion of the expanded portion of the column footing would be 6.1 meters (20 feet) wide, 8.5 meters (28 feet) long, and about 2.1 meters (7 feet) high. The above-ground portion of the expanded column footing that would extend into the historic district boundary would measure 6.1 meters (20 feet) wide by 1.5 meters (5 feet) long, and it would be about 2.1 meters (7 feet) high. This would incorporate about 9.3 square meters (100 square feet) of the historic district into the transportation facility. The work would remove adjacent vegetation consisting chiefly of naturalized berry vines; it would also relocate part of a staircase next to the column. The staircase is not itself historic and is not a contributing element to the historic district; it leads from the Parade Grounds up the hill to Macalla Road, and for most of its length it is outside the historic district and beneath the existing bridge. It provides access for USCG personnel between their facility at the shoreline and buildings and a bus stop at higher elevations on the island.

The Retrofit Existing Structure Alternative would not alter the alignment of the structure as a whole. At its closest point as measured in plan view, the structure for the Retrofit Existing Structure Alternative would still be the same horizontal distance from Quarters 1 as the existing structure, or 48 meters (157 feet). The bridge deck would remain about 36 meters (120 feet) above the level of the historic district.

Evaluation of Section 4(f) Use by the Retrofit Existing Structure Alternative. The expanded footing of Column YB2 would cause a Section 4(f) use, since land from the historic district would be permanently incorporated into the transportation facility.

Temporary Detours for Replacement Alternatives

All of the replacement alternatives require the use of temporary detours to temporarily carry traffic during construction on YBI. The only temporary detour still being considered is the north-south temporary detour. The temporary detours and their support columns would pass to the south of the boundary of Quarters 1, the nearest historic building in the historic district, but some support columns would be within the historic district boundaries. For all replacement alternatives, the supports for the temporary detours would be in the near viewshed of Quarters 1 for the length of time the temporary detours would be in place.

The north-south temporary detour for Replacement Alternative N-2 would result in a temporary detour passing above a portion of the Senior Officers' Quarters Historic District. At its closest point, the structure would be about 36 meters (120 feet) above the historic district, and about 2 meters (7 feet) horizontally to the south of Quarters 1, the nearest historic building in the historic district (see Figures 6-1 [plan view] and 6-13 [simulation] in Appendix A). The temporary detours would not remove any historic buildings. Approximately four column footings would be constructed within the grounds of the historic district in the lawn and vegetation downhill from Quarters 1, as shown in Figure 6-1 in Appendix A. Footing locations shown in Figure 6-1 are schematic; the locations would be refined during final design. The temporary detours would not restrict access to the historic district or Quarters 1.

The north-south temporary detour for Replacement Alternative N-6 would result in a temporary detour temporarily passing above a portion of the Senior Officers' Quarters Historic District. At its closest point, the structure would be about 36 meters (120 feet) above the historic district and about 2 meters (7 feet) horizontally to the south of Quarters 1, the nearest historic building in the historic district (see Figures 6-2 [plan view] and 6-13 [simulation] in Appendix A). The temporary detour would not remove any historic buildings. Approximately six column footings would be constructed in the lawn and vegetation downhill from Quarters 1, as shown in Figure 6-2 in Appendix A. Footing locations shown in Figure 6-2 in Appendix A are schematic; the locations would be refined during final design. The temporary detour would not restrict access to the historic district or Quarters 1.

The north-south temporary detour for Replacement Alternative S-4 would result in a temporary detour passing above the Senior Officers' Quarters Historic District. At its closest point, the structure would be about 36 meters (120 feet) above the historic

district and about 5 meters (16 feet) horizontally to the south of Quarters 1, the nearest historic building in the historic district (see Figures 6-3 [plan view] and 6-14 [simulation] in Appendix A). The temporary detour would not remove any historic buildings. Approximately four column footings would be constructed in the lawn and vegetation downhill from Quarters 1, as shown in Figure 6-3 in Appendix A. One other column, on the walkway to the east of Quarters 1, would also be partially within the historic district; although this column would be partially within the historic district, it would be outside the boundary of Quarters 1 itself. Footing locations are schematic; the locations would be refined during final design. The temporary detour would not restrict access to the historic district or Quarters 1.

Evaluation of Section 4(f) Use by Temporary Detours. Temporary detours would be required to build any of the replacement alternatives. The potential Section 4(f) use of the Senior Officers' Quarters Historic District by the temporary detours was evaluated. Section 4(f) use by permanent structures is discussed below. As outlined in 23 CFR §771.135(p)(7), when the following conditions are satisfied, a temporary occupancy of land is so minimal that it does not constitute a Section 4(f) use within the meaning of Section 4(f):

1. Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;

2. Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) resource are minimal;

3. There are no anticipated permanent adverse physical impacts, nor would there be interference with the activities or purposes of the resource, on either a temporary or permanent basis;

4. The land being used must be fully restored, i.e., the resource must be returned to a condition which is at least as good as that which existed prior to the project; and

5. There must be documented agreement of the appropriate federal, state, or local officials having jurisdiction over the resource regarding the above conditions.

Pursuant to 23 CFR §771.135(p)(7), the temporary detours for any of the replacement alternatives would be in place for up to 45 months; this is less than the time needed for construction of the project, which would be approximately five years. The scope of work involves the placement of columns and footings in landscaped or paved areas of the Senior Officers' Quarters Historic District. The columns would support five-lane wide temporary structures overhead.

Placement of the columns would involve some excavation within landscaped areas of the Senior Officers' Quarters Historic District, consisting of lawn and shrubbery. The excavation would result in minimal changes to the historic resource. The architecture of this historic district and its association with military history, the attributes that qualify it for the NRHP, would remain unchanged. There are no anticipated permanent adverse physical impacts from the temporary placement of columns and footings within

the grounds of the historic district. The land temporarily occupied by these columns and footings within the historic district would be fully restored as part of the project, including replacement planting and restoring the ground to its original condition. The temporary detours required for the replacement alternatives appear to meet the first four conditions outlined in 23 CFR §771.135(p)(7) for minimal occupancy of land.

In the draft Section 4(f) evaluation circulated with the DEIS, it had been assumed that the SHPO, the official having jurisdiction over historic resources, would agree with the first four criteria for minimal occupancy of land. Based on this assumption, it was determined that the temporary detours would not result in a Section 4(f) use. It was acknowledged, however, that consultation with the SHPO could result in a different outcome, requiring that this issue be revisited. Caltrans and the FHWA consulted with the SHPO to seek its agreement with the first four conditions for minimal occupancy pursuant to 23 CFR §771.135(p)(7)(v). The SHPO declined to agree or disagree regarding these conditions. Absent the agreement of the officials having jurisdiction regarding the first four criteria for minimal occupancy, FHWA has determined that the temporary detours for all replacement alternatives would result in a Section 4(f) use of the Senior Officers' Quarters Historic District. A supplemental draft Section 4(f) evaluation was prepared and circulated for review to address this Section 4(f) resource, as discussed in Section 6.1.2 of this final Section 4(f) evaluation. Comments were received on the supplemental draft Section 4(f) evaluation. Comments and responses are in Volume II, Section 3 of this FEIS.

Permanent Structures of Replacement Alternatives

The permanent structures for Replacement Alternative N-2 would be about 8 meters (26 feet) northwest of the existing bridge in the area of the historic district (in Appendix A, see Figure 6-17; Figures 6-15 and 6-16 show the existing bridge and a simulation of the Retrofit Existing Structure Alternative for comparison). The permanent structure for Replacement Alternative N-2 would extend above the southeast corner of the Senior Officers' Quarters Historic District. The bridge structure of Replacement Alternative N-2 would be built at the same elevation as the existing structure, a minimum of about 36 meters (120 feet) above the historic district. Replacement Alternative N-2 would span lawn and shrubbery, supported by bridge columns outside of the historic district. At its closest point, the new bridge structure of Replacement Alternative N-2 would be 40 meters (131 feet) horizontally from Quarters 1, the nearest historic building in the historic district. The existing bridge is 48 meters (157 feet) horizontally from Quarters 1 at the closest point, so this alternative would be 8 meters (26 feet) horizontally closer to Quarters 1 than the existing bridge.

The permanent structures for Replacement Alternative N-6 would be about 12 meters (39 feet) northwest of the existing bridge in the area of the historic district (in Appendix A, see Figure 6-17; Figures 6-15 and 6-16 show the existing bridge and a simulation of the Retrofit Existing Structure Alternative for comparison). As in the discussion of Replacement Alternative N-2 above, the permanent structure for Replacement Alternative N-6 would be about 36 meters (120 feet) above the southeast corner of the historic district, spanning lawn and shrubbery, and supported by bridge columns outside of the historic district. At its closest point, the new bridge structure would be 36 meters (118 feet) horizontally from Quarters 1, the nearest historic building in the

historic district. Therefore, this alternative would be 12 meters (39 feet) closer to Quarters 1 than the existing bridge.

The permanent structures for Replacement Alternative S-4 would be slightly farther away from the historic district than the existing bridge (in Appendix A, see Figure 6-18; Figures 6-15 and 6-16 show the existing bridge and a simulation of the Retrofit Existing Structure Alternative and northern replacement alternatives for comparison). The permanent structures would not span the historic district. At its closest point, the new bridge structure would be 54 meters (177 feet) horizontally from Quarters 1, the nearest historic building in the historic district. Therefore, this alternative would be 6 meters (20 feet) farther away from Quarters 1 than the existing bridge.

Summary of Distances from Project Alternatives to Quarters 1. Below is a table summarizing the horizontal and vertical distances from the bridge to Naval Quarters 1 (the Nimitz House) at the closest point for each alternative. Of the historic buildings in the Senior Officers' Quarters Historic District, Naval Quarters 1 is the closest one to the project alternatives. The vertical distances are measured from the bridge to the ground directly beneath the bridge at the closest horizontal distance to Quarters 1; none of the temporary or permanent structures for any build alternative actually span Quarters 1. The table is provided to assist in understanding the locations of the project alternatives in relation to Quarters 1.

Alternative	Approximate Horizontal Distance to Quarters 1 at the Closest Point	Approximate Vertical Distance to the Closest Point on the Ground Near Quarters 1
Retrofit Existing Structure Alternative	48 meters (157 feet)	37 meters (120 feet)
Replacement Alternative N-2	40 meters (131 feet)	37 meters (120 feet)
Replacement Alternative N-6	36 meters (118 feet)	37 meters (120 feet)
Replacement Alternative S-4	54 meters (177 feet)	37 meters (120 feet)
Temporary detours for any replacement alternative	2 meters (7 feet)	37 meters (120 feet)

Source: Caltrans, November 2000.

Evaluation of Section 4(f) Use by Permanent Structures of Replacement Alternatives. An "actual" Section 4(f) use would not occur as a result of the permanent structures because land from the historic district would not be permanently incorporated into the new bridge facility. Future maintenance activities on the portion of the bridge spanning the historic district by Replacement Alternative N-2 or N-6 would be addressed in a new construction and maintenance agreement executed with the property owner (currently the Navy) for the portion of the bridge traversing the historic district. The design of the permanent replacement structure (including the location of the bridge columns and footings outside of the historic district) and the required bridge maintenance activities to be addressed in the new

construction and maintenance agreement would not result in a permanent loss of use of property within the historic district.

The proximity impacts of the replacement alternatives were evaluated to determine whether they were so severe that the protected attributes that qualify the historic district for the NRHP are substantially impaired, i.e., to determine whether there would be a "constructive" Section 4(f) use. Based on this evaluation, it was determined that there would be no "constructive" Section 4(f) uses under the following potential proximity impacts: noise, views, access, and vibration. Therefore, the attributes that qualify the historic district for the NRHP, its association with military history and the architecture of its historic buildings, would not be substantially impaired by proximity impacts of any of the replacement alternatives.

6.4.3 Gateway Park

OARB is currently involved in the base closure process. The OBRA's Draft Final Reuse Plan designates 5.9 hectares (14.7 acres) at the westernmost end of the former OARB for a Public Benefit Conveyance to the EBRPD for a future park (see Figure 6-9 in Appendix A).

Retrofit Existing Structure Alternative

The Retrofit Existing Structure Alternative would be built within existing State right-of-way. It would not incorporate any land from the 5.9-hectare (14.7-acre) proposed park into the transportation project (see Figure 6-19 in Appendix A). It would not result in an actual Section 4(f) use of the proposed Gateway Park. At its closest point, the transportation facility would be 28 meters (92 feet) from the boundary of the proposed park property.

Proximity Impacts. The projected traffic noise levels at the park resulting from the Retrofit Existing Structure Alternative would be the same as for the No-Build Alternative, since the roadway location and configuration would remain the same. Projected noise levels from both the No-Build Alternative and the Retrofit Existing Structure Alternative would be the same as existing noise levels. Since the existing condition and the No-Build Alternative result in the same noise levels as the Retrofit Existing Structure Alternative in the area proposed for park use, no noise impacts to the proposed park are attributable to the Retrofit Existing Structure Alternative. There would be no constructive use of the proposed park from the Retrofit Existing Structure Alternative as a result of noise.

The proposed park would be implemented following construction of the East Span Project. A transportation facility exists at the Oakland Touchdown now, and when the park is implemented, its setting would include the transportation facility. The park planning that has taken place to date includes interagency coordination regarding ways to enhance the relationship of the transportation facility to the proposed park. The transportation facility would not substantially impair important aesthetic features or attributes of the proposed park. The operation of the transportation facility under the Retrofit Existing Structure Alternative would not restrict access to the proposed park.

The Retrofit Existing Structure Alternative would not result in an actual or a constructive use of the proposed Gateway Park.

Replacement Alternatives N-2 and N-6

Replacement Alternatives N-2 and N-6 have the same location and configuration at the Oakland Touchdown. They would be built within existing State right-of-way and right-of-way from the Port of Oakland. These alternatives would not incorporate any land from the 5.9-hectare (14.7-acre) proposed park into the transportation project (see Figure 6-19 in Appendix A). At the closest point, the transportation facility would be 46 meters (151 feet) from the boundary of the proposed park property for both of these alternatives.

Proximity Impacts. Existing noise levels range from 65 dBA at the eastern end of the proposed park land to 74 dBA near the western end. The projected traffic noise levels at the park resulting from Replacement Alternatives N-2 and N-6 would range from 67 dBA at the eastern end of the proposed park land to 70 dBA near the western end. The FHWA noise abatement criteria define 67 dBA as the threshold for traffic noise abatement consideration for parks.

At the eastern end of the proposed park, there would be a 2 dBA increase in noise levels over the existing condition. The projected noise level of 67 dBA is equal to the noise abatement threshold of 67 dBA established for parks. Since the federal noise abatement criteria are not exceeded, changes in noise levels at the eastern end of the proposed park would not result in a constructive use of the park. Near the western end of the proposed park, projected noise levels of 70 dBA for Replacement Alternatives N-2 and N-6 would exceed the threshold by 3 dBA; however, noise levels would also be reduced by 3 to 6 dBA from existing noise levels for the No-Build Alternative. Since Replacement Alternatives N-2 and N-6 would result in noise levels 3 to 6 dBA lower than they would be if the project were not implemented, changes in noise levels near the western end of the proposed park would not result in a constructive use of the future park.

The proposed park would be implemented following construction of the East Span Project. A transportation facility exists at the Oakland Touchdown now, and when the park is implemented, its setting would include the transportation facility. The park planning that has taken place to date includes interagency coordination regarding ways to enhance the relationship of the transportation facility to the proposed park. The transportation facility would therefore not substantially impair important aesthetic features or attributes of the proposed park. The operation of the transportation facility under either Replacement Alternative N-2 or N-6 would also not restrict access to the proposed park.

Replacement Alternatives N-2 and N-6 would not result in an actual or a constructive use of the proposed Gateway Park.

Replacement Alternative S-4

Replacement Alternative S-4 would be built within existing State right-of-way and right-of-way from the OARB. It would incorporate approximately 3 hectares (7.4 acres) of

the 5.9-hectare (14.7-acre) proposed park into the transportation project (see Figure 6-19 in Appendix A). This would reduce the size of the proposed park by one-half. The remaining area would accommodate the generally passive recreational activities proposed for the park, including but not limited to viewing the Bay, picnicking, and bicycling. However, the remaining land designated for park purposes would be at the greatest distance from the western end of the Oakland Touchdown. Replacement Alternative S-4 would incorporate much of the westernmost end of the park property, where views of the Bay to the south and west are the most dramatic, and where the presence of a park would most effectively enhance the experience of landfall for bridge users and for park visitors. The park's reduced size and location as a result of Replacement Alternative S-4 would therefore limit its intended function as a regionally significant recreational area and a gateway to the East Bay. Replacement Alternative S-4 would also place the transportation facility immediately adjacent to the remaining park land, thereby increasing expected noise levels in the park. For this alternative, views of the Bay from the park would be primarily to the south; views to the west would be partially obstructed by the bridge structure in the foreground. This alternative would not restrict access to the remaining park land.

Replacement Alternative S-4 would result in a Section 4(f) use of the proposed park.

6.4.4 Summary of Project Uses of Section 4(f) Resources, by Alternative

Every build alternative would result in a Section 4(f) use, though the build alternatives would not all result in the use of the same Section 4(f) resources. The matrix below summarizes the Section 4(f) resources that would be used by the project build alternatives. The No-Build Alternative would not use any Section 4(f) resources; it is not included in the matrix. Examining the Section 4(f) uses in combination demonstrates the extent of Section 4(f) uses for each build alternative.

	Retrofit Existing Structure	Replacement Alternative N-2	Replacement Alternative N-6	Replacement Alternative S-4
Existing SFOBB East Span	**P**	**P**	**P**	**P**
Senior Officers' Quarters Historic District	**P**	**T**	**T**	**T**
Proposed Gateway Park	**-**	**-**	**-**	**P**

P = Permanent Section 4(f) use;
T = Temporary occupancy resulting in a Section 4(f) use;
- = No Section 4(f) use.

All of the build alternatives would result in a permanent Section 4(f) use of the historic bridge, as a result of substantial alteration or removal of the East Span. The Retrofit Existing Structure Alternative would permanently incorporate about 9.3 square meters (100 square feet) of the grounds of the Senior Officers' Quarters Historic District, as a result of enlarging a column footing at the historic district boundary. The temporary detours for all of the replacement alternatives would temporarily use the Senior Officers' Quarters Historic District, as a result of placing about four to six temporary detour columns within the grounds of the historic district for up to 45 months during construction of the replacement bridge structure. Replacement Alternative S-4 would result in the Section 4(f) use of the proposed Gateway Park by permanently incorporating about 3 hectares (7.4 acres) of the proposed park into the bridge facility at the Oakland Touchdown.

6.5 AVOIDANCE ALTERNATIVES

Every build alternative results in a Section 4(f) use. Potential alternatives that avoid all Section 4(f) uses are addressed below, followed by a discussion of possible ways to avoid uses of individual Section 4(f) resources.

6.5.1 Build Alternatives that Avoid All Section 4(f) Uses

This section considers the potential for build alternatives that would avoid a Section 4(f) use of the existing East Span of the SFOBB and all other Section 4(f) resources.

Any build alternative that avoids all Section 4(f) uses would require construction of a new bridge, since a retrofit cannot be accomplished without causing a Section 4(f) use. All build alternatives would have one of two possible outcomes: either the existing East Span would be retained for transportation purposes or the existing East Span would no longer be used for transportation purposes.

If the existing East Span were retained for transportation purposes, it would still require extensive seismic retrofit to survive an MCE, in accordance with the project's purpose and need. The Interim Retrofit of the existing East Span adds some earthquake protection, but it will not enable the existing East Span to survive an MCE. Extensive seismic retrofit would result in modifications to the existing East Span of comparable magnitude to what is already proposed by the Retrofit Existing Structure Alternative. Extensive modification of the existing East Span would not avoid a Section 4(f) use of the East Span.

If the existing East Span were no longer used for transportation purposes and Caltrans were to propose leaving it in place, this would not meet USCG requirements. USCG has stated that, pursuant to the USCG Bridge Administration Manual, it would require that the existing East Span be removed if a new bridge were constructed (see correspondence from USCG, August 12, 1998, in Appendix G). Removal of the existing East Span pursuant to USCG's requirement would result in a Section 4(f) use of the historic resource.

All potential build alternatives would result in the need to either extensively retrofit or remove the existing East Span. Either of these actions would result in a Section 4(f) use of the historic bridge. Therefore, there is no build alternative that avoids all Section 4(f) uses.

6.5.2 Alternatives that Avoid Individual Section 4(f) Uses

There is no build alternative that avoids use of all Section 4(f) resources. The discussion below evaluates potential avoidance alternatives to avoid Section 4(f) use of individual Section 4(f) resources.

East Span of the SFOBB

Rehabilitate the Existing East Span without Affecting Its Historic Integrity. As discussed previously, the existing East Span is vulnerable to earthquake forces generated by an MCE. A retrofit strategy that would rehabilitate the East Span to withstand an MCE would require substantial alterations to the existing bridge elements. These alterations, as discussed above under the Retrofit Existing Structure Alternative, would result in a Section 4(f) use. There is no way to avoid a Section 4(f) use of the SFOBB and still rehabilitate the East Span in a manner that would enable it to withstand substantial earthquake forces. This does not constitute a feasible and prudent avoidance alternative.

Senior Officers' Quarters Historic District

Avoid Use by Retrofit Existing Structure Alternative. If bridge Column YB2 were enlarged on three sides only and not enlarged on the side nearest the historic district, this would possibly avoid a Section 4(f) use of the historic district and, as such, would constitute an avoidance of the use of the historic district. However, this is not an ideal engineering solution. It would require more piles or tie-downs underground to balance the load carried on the column foundation. It would be an "unbalanced" engineering design. Unbalanced engineering designs do not perform as well as balanced designs in a seismic event. Furthermore, tie-downs are not desirable structural elements for permanent structures, because not much is known about their long-term performance and because any below-ground failures over time would be difficult to identify, inspect, or repair. This design is not a feasible and prudent alternative to avoid use of the Senior Officers' Quarters Historic District by the Retrofit Existing Structure Alternative.

Avoid Use by Replacement Alternative Temporary Detours. Use of the historic district by the temporary detours for the replacement alternatives could be avoided by alternatives that would not make use of temporary detours to the north of the existing bridge. These alternatives include building temporary detours only to the south of the existing bridge or closing the bridge for the period it takes to construct the transition on YBI.

1. Building temporary detours to the south (the south-only temporary detour) was one of the temporary detours previously considered but no longer under consideration. The south-only temporary detour would be a double-deck structure located south of the existing transition structure. Westbound traffic would travel on the upper deck

of the existing bridge to the upper deck of the temporary detour, then to the YBI Tunnel. Eastbound traffic would exit the tunnel onto the lower deck of the temporary detour, then onto the lower deck of the existing bridge. Construction of this temporary detour would require that an 88-meter (288-foot) section of the existing bridge be cut away, removed, and replaced with a temporary detour. The replacement section would be lifted in place. It has been estimated that this operation would require complete closure of the East Span for two to four weeks, with diversion of 272,000 vehicles per day to other routes and/or transportation modes. Based on the complexity of construction and the requirement for complete closure of the East Span for over a week, the south-only temporary detour is not a feasible and prudent avoidance alternative, as it results in impacts of extraordinary magnitude.

2. The existing East Span could be closed for the period necessary to connect new structures to the existing tunnel and tunnel approach. This would eliminate the need for temporary detours, thereby avoiding a Section 4(f) use by temporary detours. The East Span would be closed for approximately 15 months in order to complete the necessary construction work. This would require diverting 272,000 vehicles per day to other routes and/or other transportation modes. The West Span would remain open to provide vehicle access to YBI and Treasure Island from San Francisco. Closing the bridge for such a length of time would result in substantial changes to regional transportation, along with economic impacts and political opposition. This construction alternative results in impacts of extraordinary magnitude, and it is not a prudent avoidance alternative.

Gateway Park

Replacement Alternative S-4 results in a Section 4(f) use of the proposed Gateway Park. The No-Build Alternative, Retrofit Existing Structure Alternative, and Replacement Alternatives N-2 and N-6 would not. The use of the proposed Gateway Park by Replacement Alternative S-4 could be avoided by selecting the No-Build Alternative, the Retrofit Existing Structure Alternative, or Replacement Alternatives N-2 or N-6. A realignment of Replacement Alternative S-4 that would reduce the use of the proposed Gateway Park and achieve a similar tie-in point with existing travel lanes would conflict with the in-Bay portion of the EBMUD outfall. See Section 2.7.5 — Replacement Alternative S-1, Further Study of Relocating or Straddling the Outfall for a discussion of risks associated with the EBMUD outfall.

6.6 MEASURES TO MINIMIZE HARM

6.6.1 Historic Resources

Memorandum of Agreement

Mitigation measures were developed through consultation with the SHPO, the ACHP, the USCG, the FHWA, and Caltrans, and with input from the Navy, CCSF, City of Oakland, historic preservation organizations, and Native Americans. These mitigation measures were incorporated into an MOA for this undertaking. The MOA was signed by FHWA, SHPO, ACHP and the USCG. Caltrans and various Native American individuals and groups are concurring parties. The executed MOA stipulates the

commitments that Caltrans and FHWA have made to mitigate the project's potential effects on historic properties. This MOA is alternative-neutral; that is, it outlines commitments that would be made for each project alternative. The commitments that apply to the alternative to be selected in the Record of Decision will be the ones that will be implemented. A copy of the executed MOA is in Appendix O of this Final Environmental Impact Statement.

East Span of the SFOBB

Preferred Alternative. The Preferred Alternative, Replacement Alternative N-6, would remove the existing East Span of the SFOBB, resulting in a Section 4(f) use of this resource. Measures to minimize harm as a result of this Section 4(f) use include (see Stipulation III, A through F, in Appendix O):

- Caltrans would offer selected components of the existing bridge to the owners of the proposed Gateway Park;
- Caltrans would develop and install permanent interpretive exhibits at the Gateway Park or an alternative East Bay location, and on YBI, pending agreements with property owners;
- Caltrans would consult with various Bay Area museums regarding development of a museum exhibit about the major bridges of the Bay. If agreement is reached with a museum, Caltrans would identify and conserve documentary materials and would contribute toward the cost of preparing and presenting the exhibit;
- Caltrans would offer the museum exhibit materials to other entities for permanent curation and public display;
- Caltrans would produce oral history documentation related to the construction and operation of the Bay Bridge; and
- Caltrans would make existing documentary videos about the bridge available to specific repositories, and will develop curriculum for use in schools.

As a related activity, Historic American Engineering Record (HAER) documentation for the entire SFOBB has been completed. It provides extensive graphic, photographic, and text recordation of the entire bridge, including the East Span. HAER recordation has been carried out as mitigation for the other seismic retrofit projects on the entire bridge from Fifth Street in San Francisco to the Oakland Touchdown.

Other Alternatives. The Retrofit Existing Structure Alternative would alter rather than remove the existing East Span. As a result, not all measures to minimize harm that are appropriate for the Preferred Alternative would apply to the Retrofit Existing Structure Alternative. Measures to minimize harm as a result of the Retrofit Existing Structure Alternative include (see Stipulations E and F, Appendix O):

- Caltrans would produce oral history documentation related to the construction and operation of the Bay Bridge; and

- Caltrans would make existing documentary videos about the bridge available to specific repositories and will develop curriculum for use in schools.

The same measures to minimize harm that apply to the Preferred Alternative, Replacement Alternative N-6, also apply to Replacement Alternatives N-2 and S-4.

Measures to Minimize Harm to the SFOBB Considered and Withdrawn

Rehabilitate the Cantilever Truss and Replace the Remaining Portions. As another project alternative, in order to minimize harm, it has been suggested that rehabilitating the cantilever truss of the East Span and constructing an improved viaduct leading up to it would be preservation-sensitive. The cantilever section was suggested for preservation efforts because particular engineering significance is attributed to this section of the East Span.

Retrofit of the cantilever truss would involve extensive work. This work was briefly cited in the description of the Retrofit Existing Structure Alternative above. More specifically, calculations have indicated that major structural members of the cantilever truss would need to be replaced if they are not structurally isolated in terms of their response to earthquake forces. In order to avoid the tremendous traffic disruption and cost associated with major replacement tasks, external strengthening would be proposed to retrofit this section. This strengthening would be accomplished by constructing additional trusses to surround, stiffen, and confine the existing cantilever truss system. The existing tower legs would require substantial widening or the addition of supplemental tower legs to support the weight of this massive new truss. The column foundations would need substantial retrofitting to withstand the additional loads. Retrofit of the cantilever truss to withstand an MCE would result in substantial changes to that section of the East Span. This alternative does minimize harm to the bridge when compared to complete dismantling. However, the cantilever would not be retrofitted to lifeline criteria, and this measure to minimize harm would not meet the project purpose and need; further, it would still substantially impair the historic engineering characteristics of the structure.

Market the Bridge in Order to Preserve It in a New Location. Marketing the bridge itself has been suggested as a measure to minimize harm. Marketing of a bridge is often pursued when a historic bridge is replaced. This is not expected to be an effective preservation measure for the East Span of the SFOBB. Because of the sheer size of the bridge span (double deck, 3.9 kilometers [2.4 miles] long) and the multiple components that comprise it (cantilever truss and multiple other trusses of varying lengths), the East Span would be extremely difficult to transfer in its entirety to a single responsible party. It is only slightly more possible that the bridge could be broken into separate trusses for relocation to multiple locations with multiple owners. It is unlikely that a party could be found who would accept the bridge either in its entirety or in segments with preservation covenants and who would be willing to have the bridge or components open to the public. If moved to a seismically active region, it would still require retrofit, at great cost. Moving costs are also likely to be prohibitive.

Senior Officers' Quarters Historic District

Preferred Alternative. The Preferred Alternative, Replacement Alternative N-6, would not result in a permanent Section 4(f) use of the Senior Officers' Quarters Historic District. It would place temporary columns and temporary support structures within and above open and landscaped areas of the historic district. FHWA determined that this activity results in a Section 4(f) use. Measures to minimize harm include (see Stipulations V and VI, Appendix O):

- Caltrans would develop and implement protective measures;
- Caltrans would repair any damage caused by the project in accordance with the Secretary of the Interior's Standards for Rehabilitation; and
- Caltrans would restore the grounds, including but not limited to placement of new sod in grass areas, replacement of shrubbery and trees, regrading and revegetation of disturbed slopes, and repair or replacement of damaged paving, sidewalks, and curbs.

Other Alternatives. Enlarging Column YB2 as part of the Retrofit Existing Structure Alternative would incorporate approximately 9.3 square meters (100 square feet) from the historic district. Columns YB2 and YB3 would be encased in concrete, obstructing views from the Senior Officers' Quarters. As a measure to minimize harm, screen planting would be provided to screen views of YB2 and YB3 from the Senior Officers' Quarters.

The measures to minimize harm to the Senior Officers' Quarters Historic District as a result of the Preferred Alternative would be the same for Replacement Alternatives N-2 and S-4.

6.6.2 Gateway Park

Preferred Alternative. Replacement Alternative N-6 would not result in a Section 4(f) use of the proposed Gateway Park, so no measures to minimize harm are proposed.

Other Alternatives. Replacement Alternative N-2 and the Retrofit Existing Structure Alternative would not result in a Section 4(f) use of the proposed Gateway Park, so no measures to minimize harm are proposed for these alternatives.

Measures to minimize harm to the proposed Gateway Park as a result of Replacement Alternative S-4 include replacing the land required for Replacement Alternative S-4 so that there would be no-net-loss of public shoreline access. This could be accomplished by acquiring land nearby to contribute toward another smaller park in the general area. Alternatively, the City of Oakland has suggested that Bay fill be added to the south of the existing shoreline to extend the park southward and retain the same acreage. BCDC staff has indicated that the outline of the Oakland Touchdown could be modified as part of the park development. Toward this end, BCDC staff has

indicated that a permit for new Bay fill may be granted if an equal or greater amount of existing Bay fill were removed from other parts of the Oakland Touchdown.

6.7 OTHER PARK, RECREATIONAL FACILITIES, WILDLIFE REFUGES, AND HISTORIC PROPERTIES EVALUATED RELATIVE TO THE REQUIREMENTS OF SECTION 4(f)

6.7.1 Introduction

The purpose of this discussion is to address Section 4(f) requirements relative to other publicly owned parks, recreational facilities, and wildlife refuges, and other historic properties in the project vicinity. There are no wildlife refuges in the vicinity. The following resources discussed below were identified in the project vicinity:

Other Existing or Proposed Park and Recreational Facilities Evaluated

- Radio Beach
- Proposed public access to the Bay at the Oakland Touchdown
- Proposed transbay segment of the Bay Trail

Other Historic Sites Evaluated

- Quarters 1
- Quarters 8
- Quarters 9
- Quarters 10
- Building 262
- Key Pier Substation (contributor to the SFOBB and individually eligible)
- Prehistoric component of Archaeological Site CA-SFr-04/H
- Potential historic archaeological deposits on YBI

The discussion of each resource either documents:

- Why the resource is not protected by the provisions of Section 4(f) or
- If it is protected by Section 4(f), why none of the alternatives under consideration causes a Section 4(f) use by:
  - permanently incorporating land into the project,
  - temporary occupancy of land that is adverse to the preservationist purposes of Section 4(f), or
  - constructive use of land from the resource.

6.7.2 Other Public Park and Recreational Facilities Within the Project Area

Near the project, three other existing or proposed park or recreational facilities were evaluated. These are Radio Beach, a proposed transbay segment of the San Francisco Bay Trail, and the proposed public access at the Oakland Touchdown as conditions on the BCDC's permit for the I-880/Cypress Freeway Replacement Project.

Radio Beach

Radio Beach is on the north side of the Oakland Touchdown, about midway between the western end and the Emeryville Crescent (see Figure 6-21 in Appendix A). It is near a radio station and radio transmission tower from which it derives its name. Radio Beach is owned by the Port. Some land in the area of Radio Beach is leased by the Port to a private leaseholder; this includes a portion of the beach itself, as well as the radio station building and the transmission tower adjacent to it (see Figure 6-21 in Appendix A).

Radio Beach has no defined boundary, no property description, and is not parceled. It has not been developed as a park, and it is not identified as a specific facility in any agency's inventory of parks. It is not considered a recreation area by the Port and, due to its small size, proximity to bridge traffic, and poor access, the Port does not consider the site to be significant for recreational purposes. Radio Beach is not protected by Section 4(f).

In spring of 2000, it appeared that EBRPD would enter into a long-term lease with the Port, to lease portions of Radio Beach not already leased to others. Caltrans initiated a meeting on March 3, 2000, with the Port, EBRPD, and FHWA to discuss land-use planning in the area. As a result of the meeting, FHWA determined that EBRPD's pending lease of Radio Beach for park purposes would make the Radio Beach area a Section 4(f) resource; FHWA further determined that a Section 4(f) use of this resource could be avoided through joint planning. Subsequently, other changes in proposed land use planning have occurred at the Oakland Touchdown. The BCDC found that OBRA's proposals for certain inland portions of the former OARB would not accommodate the Port's future needs and would not be consistent with the Seaport Plan and the San Francisco Bay Plan. As a result, OBRA has altered the proposed land uses for these portions of the base. OBRA has agreed with the Port to trade various Army Base parcels to arrive at a better overall reuse plan. In January 2001, BCDC's commission approved an application to revise the Bay Plan and the Seaport Plan based on these new reuse proposals. However, the designation of land for a future park at the western end of the base is not being revisited; OBRA remains committed to this land use proposal. As OBRA is reconsidering base reuse proposals, the Port is also reconsidering decisions regarding its property, including Radio Beach. The long-term lease of Radio Beach by EBRPD has been deferred and remains in question. EBRPD and the Port have elected to await the outcome of other land use decisions before they reaffirm an interest in entering into a lease agreement regarding Radio Beach. EBRPD's potential leasehold of Radio Beach is therefore more tenuous than it appeared to be in spring of 2000. The Port will retain ownership without leasing Radio Beach. FHWA has therefore determined that Radio Beach is not a Section 4(f) protected resource on the basis of consultation with the Port as the officials having jurisdiction (see correspondence from Port, April 1, 1999, in Appendix G).

Proposed Transbay Segment of the Bay Trail

In 1989, the Association of Bay Area Governments (ABAG) prepared the Bay Trail Plan. This plan established policies and proposed alignments for a bicycle and pedestrian trail system around the perimeter of San Francisco and San Pablo Bays. It provides a recommended route for a continuous trail and policies to guide the selection of

alignments and trail design and implementation. ABAG provides planning input but does not fund Bay Trail segments. Individual projects to implement segments of the Bay Trail are funded by other agencies and organizations. Such projects are subject to independent environmental review as well as applicable permitting from BCDC or other agencies that may have jurisdiction. The Bay Trail Plan designated many existing trails as segments of the Bay Trail, and it proposed new trail segments that would make the Bay Trail continuous. It did not specify the exact locations, features, and connections of future trail segments. Existing segments of the Bay Trail, as recreational trails on publicly owned land or easements, are Section 4(f) resources.

ABAG's Bay Trail Plan proposed that segments of the Bay Trail cross San Francisco Bay via all transbay bridges, including the SFOBB. There is currently no Bay Trail crossing of the Bay via the SFOBB. East Span Project replacement alternatives each include a bicycle/pedestrian path. ABAG supports construction of such a path as part of this project. The transbay route of the bicycle path is currently designated as "Bay Trail, proposed" by ABAG (see Figure 6-20 in Appendix A).

On June 24, 1998, the MTC voted to fund a bicycle/pedestrian path as part of a replacement structure. Therefore, the locally preferred design, as expressed by MTC, would include a bicycle/pedestrian path. The No-Build and Retrofit Existing Structure Alternatives would not include a bicycle/pedestrian path; the replacement alternatives would include a bicycle/pedestrian path. If constructed, the path may ultimately be designated as part of the Bay Trail; such a designation would extend the Bay Trail from the east shore to YBI. Caltrans is conducting a feasibility study for placing a bicycle/pedestrian path on the West Span of the SFOBB, including how to connect a path on the East Span to a potential path on the West Span. This study is still under way.

This segment of the Bay Trail does not currently exist. It is not expected to be implemented by any agency as a separate project. Although funding has been identified for a facility on the East Span that would become part of the Bay Trail, it would only be constructed as part of a replacement alternative for the East Span Project. The No-Build and Retrofit Existing Structure Alternatives would not implement this segment of the Bay Trail, and any of the replacement alternatives would implement it. The proposed Bay Trail is not protected by Section 4(f).

Proposed Public Access to the Bay at the Oakland Touchdown

As part of the I-880/Cypress Freeway Replacement Project (on I-880 in Oakland, Alameda County), Caltrans obtained a permit from the Bay Conservation and Development Commission (BCDC). The permit (number 11-93, as amended) included conditions to provide public access improvements to San Francisco Bay at the Oakland Touchdown. These include a bicycle path out to the western end of the Oakland Touchdown, where viewing areas would be provided, along with benches and limited parking. These public access improvements are described in concept in the permit granted by BCDC for the I-880/Cypress Freeway Replacement Project. The permit stipulates that these public access improvements are conditioned on the feasibility of construction; should construction prove infeasible, the permit provides that financial compensation would be accepted in lieu of constructing these improvements.

The public access improvements are conditions on the BCDC permit for a previous project. The permit conditions were developed prior to OBRA's designation of part of the former OARB as a future park. Pursuant to the amended BCDC permit, the final location of the public access improvements will be coordinated with the location of the East Span Project. The public access improvements will be implemented in compliance with BCDC permit conditions regardless of which alternative is selected for the East Span Seismic Safety Project. They will undergo separate environmental review, and they will be subject to review and approval by BCDC in order to demonstrate fulfillment of the permit conditions. Some of these public access improvements, such as the bicycle path, may be within the boundary of the proposed Gateway Park. Any such public access improvements will be jointly planned with EBRPD.

The public access improvements have not yet been constructed or developed beyond the original concept. The bicycle path out to the Oakland Touchdown is consistent with the San Francisco Bay Trail (discussed in greater detail above). Once implemented, the bicycle path would become part of the San Francisco Bay Trail. The route of the bicycle path out to the Oakland Touchdown is currently designated as "Bay Trail, proposed" by ABAG (see Figure 6-20 in Appendix A).

When replacement of the East Span became one of the retrofit strategies being considered for the East Span Project, concepts had not yet been developed for these public access improvements and both Caltrans and BCDC recognized the need for coordination between the two undertakings. Both agencies acknowledge the need for joint planning of the public access improvements and the East Span Project. In 1998, BCDC amended the permit for the I-880/Cypress Freeway Replacement Project to establish a schedule that would provide a joint planning process for these two projects and allow the public access improvements to be implemented after the East Span Project. The amended permit stipulates that "[t]he planning and final location and design of all public access areas and improvements required by this amended permit shall be coordinated with the location and design of the Bay Bridge Seismic Retrofit Project."

Pursuant to the amended permit, the final location and design of these public access improvements is subject to coordination with the East Span Project, and financial compensation may be made in place of any public access improvements for which construction proves to be infeasible. The East Span Project and the public access improvements are being jointly planned to be compatible with each other, so that there will not be a Section 4(f) use.

6.7.3 Other Historic Sites Evaluated

In addition to the bridge and its contributing elements and the Senior Officers' Quarters Historic District, there are six historic properties within the Area of Potential Effect as defined by the implementing regulations of the National Historic Preservation Act of 1966.

On YBI, the historic properties include Quarters 1, Quarters 8, Quarters 9, Quarters 10, and Building 262 (see Figures 6-4, 6-5, and 6-6 in Appendix A). All of these historic properties are eligible for the NRHP under Criteria A and/or C. Criterion A applies to historic properties associated with events that have made a significant contribution to the broad patterns of our history. Criterion C applies to historic properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

At the Oakland Touchdown, the historic property is the Key Pier Substation (see Figures 6-7 and 6-8 in Appendix A). This property is individually eligible for NRHP listing under Criterion A at the local level of significance, as a rare surviving component of the historically significant Key System railway.

There is also one prehistoric archaeological site on YBI within the Area of Potential Effect, and there is the potential for historic archaeological resources. All of these resources are discussed below.

Quarters 1

Quarters 1 is listed as an individual property on the NRHP under Criteria A and C, for its association with military history and its architecture. It is also a contributor to the Senior Officers' Quarters Historic District, which is eligible for the NRHP under Criteria A and C, for the historic district's association with military history and the architecture of its contributing buildings. Quarters 1 is of wood frame construction, with two full floors and dormered attic stories. It was constructed in 1899-1900 in the Classical Revival style. The largest and most elaborate of the buildings in the historic district, Quarters 1 was individually listed on the NRHP in 1991. Section 6.4.2 of this final Section 4(f) evaluation, which discusses the Senior Officers' Quarters Historic District, also contains discussion of Quarters 1 in its context as a contributor to the District.

The property associated with Quarters 1 is bounded by the drive in front of the house (Whiting Way), the near edge of the lawn area below Quarters 1, brick retaining walls at the edge of the paved area behind the house, and the driveway between Quarters 1 and Quarters 2.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would not incorporate any land from Quarters 1 into the transportation facility, nor would it temporarily occupy any land from Quarters 1.

The potential for constructive use was also evaluated. Quarters 1 was listed on the NRHP with the existing bridge in place; the existing noise from the bridge did not affect its listing. The attributes that qualify Quarters 1 for the NRHP are its architecture and its association with military history. There are no noise-sensitive activities associated with these attributes.

The primary views of Quarters 1 are from the flat, paved area below it, referred to as the Parade Grounds. The Retrofit Existing Structure Alternative would modify the

existing bridge, which is to the left of a viewer on the Parade Grounds; this alternative would not obstruct the primary views. Based on the 1991 National Register Registration Form prepared by the Navy for Quarters 1, with which SHPO concurred, this historic resource does not derive its value in substantial part from its setting. Vegetation removal outside the historic district as a result of construction would alter the appearance of the setting; however, it would not substantially impair the attributes that qualify this resource for the NRHP.

The Retrofit Existing Structure Alternative would not result in any permanent change in access to Quarters 1. During construction, some delays and/or closures would occur on the East Span itself, and some temporary detours and/or traffic controls would occur on YBI, which could temporarily delay persons heading toward Quarters 1 or cause them to use an alternate route. However, access to Quarters 1 itself would be maintained.

Vibration levels from impact-related construction activities, such as pile driving, have the potential to cause building damage. There are no federal or state standards for vibration levels. However, Caltrans has measured the vibrations generated during various construction activities. Pile driving has frequently been done at distances of about 7.5 to 15 meters (25 to 50 feet) from buildings without causing damage. Generally speaking, a building that is more than 15 to 30 meters (50 to 100 feet) from pile driving would not be damaged.[1] The Retrofit Existing Structure Alternative would drive piles about 55 meters (180 feet) from Quarters 1. (It should be noted that humans perceive vibration levels that are well below the architectural damage risk level; human perception of vibration is therefore not a measure of the potential for architectural damage.) Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the Retrofit Existing Structure Alternative would not substantially impair Quarters 1. Vibration from construction of the Retrofit Existing Structure Alternative would not result in proximity impacts.

The attributes that qualify Quarters 1 for the NRHP, its association with military history and its architecture, would not be substantially impaired by proximity impacts of the Retrofit Existing Structure Alternative.

The Retrofit Existing Structure Alternative would not result in a Section 4(f) use of Quarters 1.

Replacement Alternatives. None of the replacement alternatives would incorporate any land from Quarters 1 into the transportation facility, nor would it temporarily occupy any land from Quarters 1.

The potential for constructive use was also evaluated. As noted above, the NRHP listing of Quarters 1 is not based on any noise-sensitive attributes. There are no noise-sensitive activities associated with the attributes that qualify Quarters 1 for the NRHP, its architecture and its association with military history.

[1] Transportation Related Earthborne Vibrations, *Caltrans Experiences*, Caltrans, 1992.)

The primary views of Quarters 1 are from the flat, paved area below it, called the Parade Grounds. Although the alignments of Replacement Alternatives N-2 and N-6 would be closer to the historic district than the existing bridge, they would still be to the left of Quarters 1 from the perspective of a viewer on the Parade Grounds; they would not obstruct these views. The alignment of Replacement Alternative S-4 would be farther from the historic district than the existing bridge; it would not obstruct the primary views.

As noted above, this historic resource does not derive its value in substantial part from its setting. During construction, vegetation would be removed outside the Senior Officers' Quarters Historic District, which includes Quarters 1; this would alter the appearance of the setting. However, it would not substantially impair the attributes that qualify this resource for the NRHP, its architecture and its association with military history.

The replacement alternatives would not result in any permanent change in access to Quarters 1. As with the Retrofit Existing Structure Alternative, construction activities for any of the replacement alternatives could temporarily delay or reroute persons heading toward Quarters 1. However, access to Quarters 1 would be maintained.

Under the replacement alternatives, the closest pile driving would be about 90 meters (295 feet) from Quarters 1, and the closest foundation dismantling would be about 55 meters (180 feet) away. Construction-related vibration levels at Quarters 1 are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the replacement alternatives would not substantially impair Quarters 1. Vibration from construction of the replacement alternatives would not result in proximity impacts to this Section 4(f) resource.

The attributes that qualify Quarters 1 for the NRHP, its association with military history and its architecture, would not be substantially impaired by proximity impacts of the replacement alternatives.

The replacement alternatives would not result in a Section 4(f) use of Quarters 1.

Quarters 8

Quarters 8 is a three-story residence of Mediterranean design, built of wood with a stucco exterior on the first two floors (see Figures 6-4, 6-5, and 6-6 in Appendix A.) It was constructed in 1905 as the home of the commander of the Marine Corps detachment assigned to YBI. The property is eligible for the NRHP at the local level of significance under Criteria A and C, in the areas of military history and architecture. The house is historically significant as one of the few extant buildings from the early 20th century associated with the Naval Station on YBI and the last remaining building associated with the Marine Corps presence on the island. It is also architecturally significant as the work of the prominent San Francisco architects James and Merritt Reid.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would not incorporate any land from Quarters 8 into the transportation facility, nor would it temporarily occupy any land from Quarters 8.

The potential for constructive use was also evaluated. Quarters 8 was determined to be eligible for the NRHP with the existing bridge in place; the existing noise from the bridge did not affect its eligibility. Its eligibility is not based on any noise-sensitive attributes. The attributes that qualify Quarters 8 for the NRHP are in the areas of military history and architecture. There are no noise-sensitive activities associated with these attributes.

The primary views of Quarters 8 are from the roadway approaching and in front of it; the Retrofit Existing Structure Alternative would not obstruct the primary views. Based on the 1997 Primary Record Form prepared by Caltrans for Quarters 8, with which SHPO concurred, this historic resource does not derive its value in substantial part from its setting. Vegetation removal nearby as a result of construction would alter the appearance of the setting; however, it would not substantially impair the attributes that qualify this resource for the NRHP.

The Retrofit Existing Structure Alternative would not result in any permanent change in access to Quarters 8, though construction activities could delay or reroute persons heading toward Quarters 8. However, access to Quarters 8 would be maintained.

Under the Retrofit Existing Structure Alternative, the closest foundation work would be about 70 meters (230 feet) from Quarters 8. Construction-related vibration levels at Quarters 8 are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the Retrofit Existing Structure Alternative would not substantially impair Quarters 8. Vibration from construction of the Retrofit Existing Structure Alternative would not result in proximity impacts to this Section 4(f) resource.

The attributes that qualify Quarters 8 for the NRHP, its association with military history and its architecture, would not be substantially impaired by proximity impacts of the Retrofit Existing Structure Alternative.

The Retrofit Existing Structure Alternative would not result in a Section 4(f) use of Quarters 8.

Replacement Alternatives. None of the replacement alternatives would incorporate any land from Quarters 8 into the transportation facility, nor would they temporarily occupy any land from Quarters 8.

The potential for constructive use was also evaluated. The replacement alternatives would reduce noise levels at Quarters 8. The replacement alternatives would not obstruct the primary view of Quarters 8, which is from the roadway approaching and in front of the building. Removal of vegetation near Quarters 8 during construction would

alter the appearance of the setting of this historic building. This change in the setting as a result of replacement alternatives would not alter the historic building's association with military history or its architecture, the attributes that qualify it for the NRHP. The replacement alternatives would not result in any permanent change in access to Quarters 8.

Under the replacement alternatives, the closest pile driving would be about 80 meters (260 feet) from Quarters 8, and the closest foundation dismantling would be about 70 meters (230 feet) away. Pavement work to alter the roadways near Quarters 8 is typical local street roadwork, and it would not generate architecturally damaging vibration levels. Construction-related vibration levels at Quarters 8 are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the replacement alternatives would not substantially impair Quarters 8. Vibration from construction of the replacement alternatives would not result in proximity impacts to this Section 4(f) resource.

The attributes that qualify Quarters 8 for the NRHP (its association with military history and its architecture) would not be substantially impaired by proximity impacts of the replacement alternatives.

The replacement alternatives would not result in a Section 4(f) use of Quarters 8.

Quarters 9

Quarters 9 is a 1-1/2-story residence of wood-frame construction. (See Figures 6-4, 6-5, and 6-6 in Appendix A.) The property is eligible for the NRHP at the local level of significance under Criteria A and C, in the areas of military history and architecture. It was built ca. 1916 as the residence for the civilian "master of tugs" and is the only extant building on YBI constructed for a civilian employee of the Navy. It is also one of the few surviving buildings on the island from the period of extensive growth of the Naval Station in the years before and during U.S. involvement in World War I.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would not incorporate any land from Quarters 9 into the transportation facility, nor would it temporarily occupy any land from Quarters 9.

The potential for constructive use was also evaluated. Noise from the existing bridge did not affect the eligibility of Quarters 9 for the NRHP. The attributes that qualify Quarters 9 for the NRHP are in the areas of military history and architecture, which are not noise-sensitive attributes. There are no noise-sensitive activities associated with these attributes.

The primary views of Quarters 9 are from the approach to the building. Trees currently screen views of Quarters 9 from most directions; these trees would not be removed by the Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would not obstruct the primary views.

The Retrofit Existing Structure Alternative would not result in any permanent change in access to Quarters 9, though construction activities could delay or reroute persons heading toward it. Access to Quarters 9 would be maintained during construction.

Under the Retrofit Existing Structure Alternative, the closest foundation work would be about 140 meters (455 feet) from Quarters 9. Construction-related vibration levels at Quarters 9 are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the Retrofit Existing Structure Alternative would not substantially impair Quarters 9. Vibration from construction of the Retrofit Existing Structure Alternative would not result in proximity impacts to this Section 4(f) resource.

The attributes that qualify Quarters 9 for the NRHP, its association with military history and its architecture, would not be substantially impaired by proximity impacts of the Retrofit Existing Structure Alternative.

The Retrofit Existing Structure Alternative would not result in a Section 4(f) use of Quarters 9.

Replacement Alternatives. None of the replacement alternatives would incorporate any land from Quarters 9 into the transportation facility, nor would they temporarily occupy any land from Quarters 9.

The potential for constructive use was also evaluated. The attributes that qualify Quarters 9 for the NRHP are in the areas of military history and architecture, which are not noise-sensitive attributes. There are no noise-sensitive activities associated with these attributes.

The primary views of Quarters 9 are from the approach to the building. Trees currently screen views from most directions; these trees would not be removed by any of the build alternatives for the East Span Project. The replacement alternatives would not obstruct the primary views.

The replacement alternatives would not result in any permanent change in access to Quarters 9, though construction activities could delay or reroute persons heading toward it. Access to Quarters 9 would be maintained during construction.

Under the replacement alternatives, the closest pile driving would be about 125 meters (410 feet) from Quarters 9, and the closest foundation dismantling would be about 140 meters (460 feet) away. Construction-related vibration levels at Quarters 9 are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the replacement alternatives would not substantially impair Quarters 9. Vibration from construction of the replacement alternatives would not result in proximity impacts to this Section 4(f) resource.

The attributes that qualify Quarters 9 for the NRHP, its association with military history and its architecture, would not be substantially impaired by proximity impacts of the replacement alternatives.

The replacement alternatives would not result in a Section 4(f) use of Quarters 9.

Quarters 10

Quarters 10 is a two-story wood-frame residence constructed in 1948 (see Figures 6-4, 6-5, and 6-6 in Appendix A). The property is eligible for the NRHP at the local level of significance under Criterion C, for its architecture. It is architecturally significant as a distinctive example of Bay Area modernism. The historic property includes the house and its immediate grounds, including adjacent lawn and garden areas, the garage (Building 267) and driveway, and the retaining wall along the north side of the property. Quarters 10 is next to Macalla Road, which is not historic.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would not incorporate any land from Quarters 10 into the transportation facility, nor would it temporarily occupy any land from Quarters 10.

The potential for constructive use was also evaluated. Noise from the existing bridge did not affect its eligibility. The attribute that qualifies Quarters 10 for the NRHP is its architecture, which is not a noise-sensitive attribute. There are no noise-sensitive activities associated with this attribute.

The primary views of Quarters 10 are from Macalla Road, which bends in a hairpin turn around the property. Nearby trees screen views of Quarters 10 from most other directions. The Retrofit Existing Structure Alternative would not obstruct the primary views. Based on the 1998 Primary Record Form prepared by Caltrans for Quarters 10, with which SHPO concurred, this historic resource does not derive its value in substantial part from its setting. Vegetation removal nearby as a result of construction would alter the appearance of the setting; however, vegetation removal would not substantially impair the attributes that qualify this resource for the NRHP.

The Retrofit Existing Structure Alternative would not result in any permanent change in access to Quarters 10, though construction activities could delay or reroute persons heading toward it.

Under the Retrofit Existing Structure Alternative, the closest foundation work would be about 60 meters (195 feet) from Quarters 10. Construction-related vibration levels at Quarters 10 are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the Retrofit Existing Structure Alternative would not substantially impair Quarters 10. Vibration from construction of the Retrofit Existing Structure Alternative would not result in proximity impacts to this Section 4(f) resource.

The attribute that qualifies Quarters 10 for the NRHP, its architecture, would not be substantially impaired by proximity impacts of the Retrofit Existing Structure Alternative.

The Retrofit Existing Structure Alternative would not result in a Section 4(f) use of Quarters 10.

Replacement Alternatives. None of the replacement alternatives would incorporate any land from Quarters 10 into the transportation facility, nor would they temporarily occupy any land from Quarters 10.

The potential for constructive use was also evaluated. The attribute that qualifies Quarters 10 for the NRHP is its architecture, which is not a noise-sensitive attribute. There are no noise-sensitive activities associated with this attribute.

The primary views of Quarters 10 are from Macalla Road, which bends in a hairpin turn around the property. Nearby trees screen views of Quarters 10 from most other directions. The replacement alternatives would not obstruct the primary views. A number of trees downslope of Quarters 10 would be removed by the replacement alternatives; this would remove some of the existing screening and may increase the views of Quarters 10. Based on the information in Caltrans' 1998 Primary Record Form for Quarters 10, with which SHPO concurred, this historic property does not derive its value in substantial part from its setting. Although nearby vegetation removal during construction would alter the appearance of the setting, vegetation removal would not substantially impair the architecture of Quarters 10, which is the attribute that qualifies it for the NRHP.

The replacement alternatives would not result in any permanent change in access to Quarters 10. Activities during construction could delay or reroute persons heading toward Quarters 10. During construction, regrading of Macalla Road at the hairpin turn below Quarters 10 would restrict vehicle access to Quarters 10 for about one to three days, though the historic property would remain accessible on foot.

Under the replacement alternatives, the closest pile driving would be about 110 meters (360 feet) from Quarters 10, and the closest foundation dismantling would be about 60 meters (195 feet) away. Pavement breaking to alter the grade of Macalla Road by Quarters 10 is typical local street roadwork, and it would not generate architecturally damaging vibration levels. Construction-related vibration levels at Quarters 10 are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the replacement alternatives would not substantially impair Quarters 10. Vibration from construction of the replacement alternatives would not result in proximity impacts to this Section 4(f) resource.

The attribute that qualifies Quarters 10 for the NRHP, its architecture, would not be substantially impaired by proximity impacts of the replacement alternatives.

The replacement alternatives would not result in a Section 4(f) use of Quarters 10.

Building 262

Building 262, at the eastern end of YBI, is a reinforced concrete building with a corrugated tin gable roof (see Figures 6-4, 6-5, and 6-6 in Appendix A). The property is eligible for the NRHP at the state level of significance under Criteria A and C, in the areas of military history and architecture. It was constructed for the U.S. Army in 1891 for the manufacture and storage of mines to be used in coastal defense. The building is historically significant as the only extant building associated with the 19th century Army presence on YBI. It is also significant architecturally, as a pioneering example of reinforced concrete construction, a building technique that was still in its infancy in 1891. The boundary of the historic resource, as described in the evaluation form prepared by the Navy, includes only the building itself.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would modify the existing bridge. The existing bridge passes approximately 28 meters (90 feet) to the southeast of Building 262, and is about 53 meters (175 feet) above the ground in this area. The Retrofit Existing Structure Alternative would not incorporate any land from Building 262 into the transportation facility, nor would it temporarily occupy any land from Building 262.

The potential for constructive use was also evaluated. Noise from the existing bridge did not affect the eligibility of Building 262 for the NRHP. The attributes that qualify it for the NRHP are in the areas of military history and architecture, which are not noise-sensitive attributes. There are no noise-sensitive activities associated with these attributes.

The primary views of Building 262 are from the unpaved access road leading to the building and from boats on the Bay near the eastern end of the island. Under the Retrofit Existing Structure Alternative, existing columns would be enlarged and two additional columns would be added in the main navigation opening between Columns E2 and E3. This would not obstruct primary views of Building 262. Based on the 1997 Primary Record Form prepared by the Navy, with which SHPO concurred, Building 262 does not derive its value in substantial part from its setting. The addition and enlargement of bridge columns would alter the appearance of the setting; however, these changes would not substantially impair the attributes that qualify this resource for the NRHP.

The Retrofit Existing Structure Alternative would not result in any permanent change in access to Building 262, though construction activities could delay or reroute persons heading toward it.

Under the Retrofit Existing Structure Alternative, the closest foundation work would be about 45 meters (150 feet) from Building 262. Construction-related vibration levels at Building 262 are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the Retrofit Existing Structure Alternative would not substantially impair

Building 262. Vibration from construction of the Retrofit Structure Alternative would not result in proximity impacts to this Section 4(f) resource.

The attributes that qualify Building 262 for the NRHP, its association with military history and its architecture, would not be substantially impaired by proximity impacts of the Retrofit Existing Structure Alternative.

The Retrofit Existing Structure Alternative would not result in a Section 4(f) use of Building 262.

Replacement Alternatives. Under Replacement Alternatives N-2 and N-6, the new bridge would pass directly above Building 262 at approximately the same height as the existing bridge, or about 53 meters (175 feet) above the ground. Replacement Alternative S-4 would pass to the southeast of Building 262 rather than directly above it, and would be farther away from Building 262 than the existing bridge. None of the replacement alternatives would incorporate any land from Building 262 into the transportation facility, nor would they temporarily occupy any land from Building 262.

The potential for constructive use was also evaluated. Noise from the existing bridge did not affect the eligibility of Building 262 for the NRHP. The attributes that qualify it for the NRHP are in the areas of military history and architecture, which are not noise-sensitive attributes. There are no noise-sensitive activities associated with these attributes.

The primary views of Building 262 are from the access road leading to the building and from boats on the Bay near the eastern end of the island. Under Replacement Alternatives N-2 and N-6, a new structure would be built that would span Building 262, and the existing bridge would be dismantled; under Replacement Alternative S-4, a new structure would be built to the south of the existing bridge, and the existing bridge would be dismantled. None of the replacement alternatives obstructs the primary views of Building 262. Building 262 does not derive its value in substantial part from its setting; changing the location of the bridge structure would alter the appearance of the setting, but it would not substantially impair the attributes that qualify this resource for the NRHP.

The replacement alternatives would not result in any permanent change in access to Building 262, though construction activities could delay or reroute persons heading toward it.

Under the replacement alternatives, the closest pile driving would be about 60 meters (195 feet) from Building 262, and the closest foundation dismantling would be about 45 meters (150 feet) away. Construction-related vibration levels at Building 262 are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the replacement alternatives would not substantially impair Building 262. Vibration from construction of the replacement alternatives would not result in proximity impacts to this Section 4(f) resource.

The attributes that qualify Building 262 for the NRHP, in the areas of military history and architecture, would not be substantially impaired by proximity impacts of the replacement alternatives.

The replacement alternatives would not result in a Section 4(f) use of Building 262.

Summary of Distances from Project Alternatives to Building 262. Below is a table summarizing the horizontal and vertical distances from the bridge to Building 262 (the Torpedo Building) at the closest point for each alternative. The table is provided to assist in understanding the locations of the project alternatives in relation to this historic property. For Replacement Alternatives N-2 and N-6, the horizontal distance is zero; this is because these two alternatives would be constructed to span Building 262 while leaving it in place. Vertical distances are measured from the bridge to the ground directly beneath the bridge at the closest horizontal distance to the building. The building is about 12 meters (40 feet) tall at the top of its gable; Replacement Alternatives N-2 and N-6 would be built about 41 meters (135 feet) above the rooftop of Building 262. Building 262 is not within the area where the temporary detours for the replacement alternatives would be constructed, so horizontal and vertical distances for the temporary detours have been omitted from this table.

Alternative	Approximate Horizontal Distance to Building 262 at the Closest Point	Approximate Vertical Distance to the Closest Point on the Ground Near Building 262
Retrofit Existing Structure Alternative	28 meters (90 feet)	53 meters (175 feet)
Replacement Alternative N-2	0 meter (0 foot)	53 meters (175 feet)
Replacement Alternative N-6	0 meter (0 foot)	53 meters (175 feet)
Replacement Alternative S-4	59 meters (194 feet)	53 meters (175 feet)

Source: Caltrans, November 2000.

While FHWA determined that the project would not result in a Section 4(f) use of Building 262, the building is within the construction zone for the Preferred Alternative, Replacement Alternative N-6, as well as Replacement Alternative N-2. These two replacement alternatives would be constructed over the top of Building 262. In the MOA for the protection of historic properties, Caltrans and FHWA have made commitments to minimize potential harm to Building 262 as a result of all project alternatives, including these two alternatives that would be constructed over the building. The commitments include development and implementation of protective measures, repair of inadvertent damage, and preparation of a historic structure report (see Stipulation IV of the MOA, Appendix O of this FEIS).

Key Pier Substation

The Key Pier Substation is historically significant under Criterion A at the local level. It is a contributor to the SFOBB, and it is also individually eligible as one of the few surviving buildings associated with the Key System (see Figures 6-7 and 6-8 in Appendix A). The boundary of the property includes only the building itself.

Retrofit Existing Structure Alternative. The Retrofit Existing Structure Alternative would not incorporate any land from the Key Pier Substation into the transportation facility, nor would it temporarily occupy any land from the Key Pier Substation.

The potential for constructive use was also evaluated. Noise from the existing bridge did not affect the eligibility of the Key Pier Substation for the NRHP. The attributes that qualify it for the NRHP, being a contributor to the SFOBB as well as a rare surviving building associated with the Key System, are not noise-sensitive attributes. There are no noise-sensitive activities associated with these attributes.

The primary views of the Key Pier Substation are from the roadway in front of it. The Retrofit Existing Structure Alternative would not obstruct its primary views. Based on the 1998 evaluation prepared by Caltrans, with which SHPO concurred, the Key Pier Substation does not derive its value in substantial part from its setting. Although the Retrofit Existing Structure Alternative would alter the appearance of the bridge, thereby changing the setting, this change in the setting would not substantially impair the attributes that qualify the Key Pier Substation for the NRHP.

The Retrofit Existing Structure Alternative would not result in any permanent change in access to this historic building, though access may be restricted during construction. This temporary change in access does not constitute a constructive use; access to the Key Pier Substation is not relevant to its being a contributor to the SFOBB and a surviving building associated with the Key System, which are the attributes that qualify it for the NRHP.

Under the Retrofit Existing Structure Alternative, the closest foundation work would be about 45 meters (150 feet) from the Key Pier Substation. Construction-related vibration levels at the Key Pier Substation are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the Retrofit Existing Structure Alternative would not substantially impair the Key Pier Substation. Vibration from construction of the Retrofit Existing Structure Alternative would not result in proximity impacts to this Section 4(f) resource.

The attributes that qualify it for the NRHP, its association with the SFOBB and the Key System, would not be substantially impaired by proximity impacts of the Retrofit Existing Structure Alternative.

The Retrofit Existing Structure Alternative would not result in a Section 4(f) use of the Key Pier Substation.

Replacement Alternatives. None of the replacement alternatives would incorporate any land from the Key Pier Substation into the transportation facility, nor would they temporarily occupy any land from the Key Pier Substation.

The potential for constructive use was also evaluated. The attributes that qualify the Key Pier Substation for the NRHP, as a contributor to the SFOBB and a surviving building associated with the Key System, are not noise-sensitive attributes. There are no noise-sensitive activities associated with these attributes.

The primary views of the Key Pier Substation are from the roadway in front of it. Replacement Alternatives N-2 and N-6 would construct a structure farther away from the Key Pier Substation than the existing bridge; Replacement Alternative S-4 would construct a structure near the Key Pier Substation but in the opposite direction of the primary views. The replacement alternatives would not obstruct the primary views of this historic property. The Key Pier Substation does not derive its value in substantial part from its setting. Although any of the replacement alternatives would alter the location and appearance of the bridge, this would not substantially impair the attributes that qualify the Key Pier Substation for the NRHP, as a contributor to the SFOBB and a surviving building associated with the Key System.

The replacement alternatives would not result in any permanent change in access to this historic building, though access may be restricted during construction.

Under the replacement alternatives, the closest pile driving would be about 110 meters (360 feet) from the Key Pier Substation, and the closest foundation dismantling would be about 45 meters (150 feet) away. Construction-related vibration levels at the Key Pier Substation are therefore expected to be below the architectural damage risk level. Construction-period impacts would also be documented and monitored (see Stipulation V of the MOA in Appendix O of this FEIS). As a result, vibration levels from construction of the replacement alternatives would not substantially impair the Key Pier Substation. Vibration from construction of the replacement alternatives would not result in proximity impacts to this Section 4(f) resource.

The attributes that qualify the Key Pier Substation for the NRHP would not be substantially impaired by proximity impacts of the replacement alternatives.

The replacement alternatives would not result in a Section 4(f) use of the Key Pier Substation.

Archaeological Site

Section 4(f) applies to all archaeological sites on or eligible for inclusion on the NRHP, except when the archeological resource is important chiefly because of what can be learned by data recovery and it has minimal value for preservation in place (23 CFR §771.135[g][2]). The archaeological site on YBI, CA-SFr-04/H, is potentially eligible for the NRHP listing under Criterion D, and since this site has yielded and may again yield human remains, the SHPO concluded that its potential significance may extend beyond Criterion D. Evaluation of the site has resulted in the conclusion that the site is

important chiefly for the information it contains. It does not warrant preservation in place. Accordingly, Section 4(f) does not apply to this archaeological site.

6.8 COORDINATION

6.8.1 Historic Resources

Memorandum of Agreement. Compliance with Section 106 of the National Historic Preservation Act and its implementing regulations has been achieved through coordination among Caltrans, the FHWA, the SHPO, and the ACHP.

FHWA, SHPO, ACHP, and the USCG executed an MOA pursuant to Section 106 of the National Historic Preservation Act on May 26, 2000 (see Appendix O). Caltrans and various Native American individuals and groups are concurring parties. Other Native American individuals and groups, the Navy, the City of Oakland, and the City and County of San Francisco were invited to sign as concurring parties but did not respond. The MOA describes measures to reduce and mitigate adverse effects to historic properties and the archaeological site.

Historic Preservation Community

In April of 1997, letters were sent to the following organizations inviting their comments on this undertaking:

- American Society of Civil Engineers, History & Heritage Committee
- Berkeley Architectural Heritage Association
- California Preservation Foundation
- Foundation for San Francisco's Architectural Heritage
- National Trust for Historic Preservation, Western Regional Office
- Oakland Heritage Alliance
- Oakland Landmarks Preservation Advisory Board (LPAB)
- San Francisco Landmarks Preservation Advisory Board (LPAB)

In July of 1997, representatives of Caltrans attended a meeting of the Oakland LPAB and gave a brief presentation on the undertaking. This meeting was also attended by representatives from the Oakland Heritage Alliance, the California Preservation Foundation, and staff to the San Francisco LPAB.

The Oakland LPAB responded by letter on January 14, 1998, advocating that consideration be given to retrofit of the existing bridge rather than replacement and suggesting several mitigation measures if a replacement alternative is selected and the existing East Span is dismantled (see Appendix G). No other organizations responded to Caltrans' April 1997 invitation for comments on the undertaking. The San Francisco LPAB placed the project on the agenda of its January 2000 meeting; however, the item was deferred prior to the meeting, and it has not been taken up subsequently. Caltrans continues to coordinate with the Oakland LPAB regarding potential mitigation measures and other historic preservation issues associated with the East Span Project.

Staff and members of the Oakland LPAB and the CCSF have also attended and offered public comment at meetings of the MTC and MTC's Engineering and Design Advisory Panel regarding this project. They have also attended special focused meetings and project development team meetings.

Draft Section 4(f) Evaluation. The draft Section 4(f) evaluation was circulated to the public on September 23, 1998 together with the Draft Environmental Impact Statement (DEIS). Many of the above agencies submitted written comments on the draft Section 4(f) evaluation and the DEIS. Comments received on the draft Section 4(f) evaluation are included with the letters commenting on the DEIS; responses to these comments are in Volume II, Section 1 of the FEIS. There is also an index of Section 4(f)-related correspondence at the end of this final Section 4(f) evaluation.

The following DEIS comment letters contain comments about the draft Section 4(f) evaluation:

Department of the Interior ..... December 18,1998
City of Oakland, Landmarks Preservation Advisory Board..... November 23, 1998
California Preservation Foundation..... November 23, 1998
National Trust for Historic Preservation ..... November 23, 1998

The following additional DEIS comment letters comment on historic resources protected by Section 4(f) but do not refer to the draft Section 4(f) evaluation:

City of Oakland Planning Department ..... November 20, 1998
U.S. Navy ..... November 23, 1998
City and County of San Francisco Planning Department..... November 23, 1998

Supplemental Draft Section 4(f) Evaluation. The supplemental draft Section 4(f) evaluation was sent to the Department of the Interior and the following agencies and organizations on June 29, 1999:

- Advisory Council on Historic Preservation
- U.S. Navy
- U.S. Coast Guard
- U.S. Army
- Oakland Base Reuse Authority
- Port of Oakland
- East Bay Regional Park District
- California Preservation Foundation
- National Trust for Historic Preservation
- Oakland Landmarks Preservation Advisory Board
- San Francisco Landmarks Preservation Advisory Board
- Treasure Island Reuse Authority
- City of Oakland
- California Department of Parks and Recreation

The following letters commented on the supplemental draft Section 4(f) evaluation (see Volume II, Section 3, of the FEIS and the index of Section 4(f)-related correspondence at the end of this final Section 4(f) evaluation):

Department of the Interior ..... September 2, 1999
City of Oakland Planning Department ..... August 18, 1999
City and County of San Francisco, Treasure Island Project ..... August 24, 1999

Comments received on the draft Section 4(f) and the supplemental draft Section 4(f) were considered and, if appropriate, changes were made to this final Section 4(f) evaluation.

6.8.2 Gateway Park

Caltrans initiated coordination meetings with the EBRPD and the Port to discuss the East Span Project, land use issues, and Gateway Park development possibilities. The City of Oakland, the Army, the NPS, BCDC, and ABAG have also participated. Meetings to discuss the proposed park were held on October 7, 1997; November 18, 1997; February 18, 1998; May 20, 1998; July 22, 1998; December 2, 1998; February 10, 1999; and August 11, 1999. EBRPD has held other meetings since then regarding park planning; these have not included Caltrans or FHWA. Future interagency meetings are anticipated.

On October 29, 1998, EBRPD commented on the project DEIS in its relation to the proposed park (see Volume II, Section 1, of the FEIS). In addition, many interested agencies attended a meeting on March 11, 1999, to discuss each agency's perspective on the status of the Gateway Park.

EBRPD also commented on the supplemental draft Section 4(f) evaluation in a letter received September 15, 1999. Comments on the supplemental draft Section 4(f) evaluation are in Volume II, Section 3, of the FEIS. There is an index of Section 4(f)-related correspondence at the end of this final Section 4(f) evaluation.

6.8.3 Radio Beach

Caltrans consulted with the Port, owner and official having jurisdiction over Radio Beach, regarding the significance of Radio Beach as a publicly owned park or recreation facility. The Port provided written correspondence about Radio Beach on April 1, 1999 (see Appendix G of the FEIS). Caltrans also met on March 3, 2000, with the Port, EBRPD, and FHWA to discuss the disposition of Radio Beach (see section 6.7.2 of this final Section 4(f) evaluation for information about this meeting).

6.8.4 Summary of Formal Coordination with the Department of the Interior

The draft Section 4(f) evaluation was sent to the Department of the Interior in the DEIS on September 24, 1998. The Department of the Interior commented on the draft Section 4(f) evaluation in a letter dated December 18, 1998. This letter may be found in Volume II, Section 1, of the FEIS, along with responses to the comments.

A supplemental draft Section 4(f) evaluation was sent to the Department of the Interior on June 29, 1999. The Department of the Interior commented on the supplemental draft Section 4(f) evaluation in a letter dated September 2, 1998. This letter may be found in Volume II, Section 3, of the FEIS, along with responses to the comments.

Additional Participation by the National Park Service

The NPS participated in activities associated with the proposed Gateway Park in coordination with the East Span Project. NPS attended the following meetings and sent the following correspondence:

- 10/7/97: NPS attended a field review of the OARB property at the Oakland Touchdown. NPS explained its role in possible transfer of OARB property to the EBRPD through the Federal Lands to Parks Program. NPS also asked if an interpretive exhibit was being considered for the East Span Project during construction, if a replacement alternative is selected.

- 10/30/97: NPS sent a letter to Caltrans, affirming its offer of assistance and support to EBRPD, and noting its role in the Federal Lands to Parks Program as well as various options for property conveyance involving the Port and EBRPD.

- 11/4/97: NPS attended a Workshop meeting about pedestrian and bicycle access at the Oakland Touchdown.

- 2/18/98: NPS attended a park coordination meeting.

- 5/20/98: NPS attended a park coordination meeting.

- 6/2/98: NPS attended a park coordination meeting.

- 7/22/98: NPS attended a park coordination meeting.

- 3/11/99: NPS attended a meeting to discuss the status of the Gateway Park and Section 4(f). NPS stated its support for the park and its concerns that Alternative S-4 would adversely affect the park.

6.9 CONCLUSIONS

6.9.1 Basis for Concluding That There Are No Prudent and Feasible Alternatives to the Use of Section 4(f) Land

There are unique problems involved in the use of alternatives that avoid the use of the SFOBB. All potential build alternatives would result in the need to either extensively retrofit or remove the existing East Span. Either of these actions would result in a Section 4(f) use of the historic bridge. There is no build alternative that avoids all Section 4(f) uses.

The Retrofit Existing Structure Alternative would not require removal of the existing East Span. As such, it could be considered a means of minimizing harm to the SFOBB, a Section 4(f) resource, as compared to the replacement alternatives. However, the Retrofit Existing Structure Alternative should not be considered as a means of minimizing harm to the SFOBB. Under the Retrofit Existing Structure Alternative, the East Span would incur moderate to major damage in an MCE; it would not be open to emergency traffic shortly after an MCE, and normal traffic might never be allowed back on the bridge. This means that it would not meet lifeline criteria for providing post-earthquake relief access for emergency vehicles. As such, it does not fully meet purpose and need. In addition, the damage to this heavily used facility in an MCE would close the East Span for a period of months or years to conduct repairs or replacement. Furthermore, it does not avoid future harm to the SFOBB, since the bridge would require extensive repairs or replacement following an MCE. Therefore, its ability to minimize harm to the SFOBB would only be in effect until the bridge experiences an MCE. Since the Retrofit Existing Structure Alternative does not fully meet the project's purpose and need, it would lead to economic losses of extraordinary magnitude following an MCE, and it does not avoid future harm to the SFOBB, the Retrofit Existing Structure Alternative is not a prudent alternative.

The project alternatives evaluated, and the project alternatives considered and withdrawn, are discussed in Chapter 2 of the FEIS. Alternatives that avoid Section 4(f) uses are discussed in Section 5 of this final Section 4(f) evaluation.

6.9.2 Basis for Concluding That the Proposed Action Includes All Possible Planning to Minimize Harm to Section 4(f) Properties

As discussed previously, there is no build alternative that avoids a Section 4(f) use of the SFOBB. Other Section 4(f) uses must therefore be considered in order to establish which alternative results in the least harm to Section 4(f) resources.

None of the replacement alternatives avoids a Section 4(f) use of the Senior Officers' Quarters Historic District, because they all require the placement of columns within the district to support temporary detours. Of the replacement alternatives, only Replacement Alternative S-4 results in a Section 4(f) use of the proposed Gateway Park. This alternative would incorporate about 3 hectares (7.4 acres) of the proposed park land, constituting about half of the park; the land would be incorporated into the transportation facility and would not be restored to park use following the project.

The Preferred Alternative (Replacement Alternative N-6), Replacement Alternative N-2, and the Retrofit Existing Structure Alternative avoid the Section 4(f) use of the proposed Gateway Park. The Retrofit Existing Structure Alternative would permanently incorporate about 9.3 square meters (100 square feet) of the grounds of the Senior Officers' Quarters Historic District as a result of enlarging a column footing at the historic district boundary.

The permanent use of the historic district by the Retrofit Existing Structure Alternative may be avoided by selecting a replacement alternative. While there is a Section 4(f) use of the historic district by the replacement alternatives, it is temporary in nature, involving the placement of about six columns for temporary detours within vegetated areas of the district for a period of up to four years. Furthermore, Caltrans and FHWA have committed to restoring affected areas following project construction. As a result, the Section 4(f) use of the historic district by the replacement alternatives would not be readily apparent following implementation of the project and restoration measures. In contrast, the Retrofit Existing Structure Alternative would result in a permanent use of land from the district.

The signed MOA pursuant to the National Historic Preservation Act documents the commitments made by Caltrans and FHWA to minimize harm to the historic resources affected by each alternative for the project. The MOA is in Appendix O. The commitments made in the MOA constitute the means of minimizing harm to historic resources for each project alternative. These measures include, but are not limited to, monitoring of historic structures during construction; restoration of historic grounds after construction; restoration of any inadvertent damage to historic structures to the Secretary of the Interior's Standards; and various historical preservation measures for the SFOBB itself. See the MOA itself for a complete listing of the documented commitments.

6.9.3 Feasible and Prudent Alternative with the Least Net Harm to Section 4(f) Resources after Considering Mitigation

Replacement Alternatives N-2 and N-6 are the feasible and prudent alternatives with the least net harm to Section 4(f) resources after considering mitigation. On the basis of the previous consideration of the various Section 4(f) uses resulting from each project alternative and the measures to minimize harm, the FHWA concludes that Replacement Alternatives N-2 and N-6 result in the least harm to Section 4(f) resources. There is no difference between Replacement Alternatives N-2 and N-6 in terms of the application of Section 4(f). Replacement Alternative N-6 has been chosen as the Preferred Alternative over Replacement Alternative N-2 on the basis of other factors, including ease of construction of the main tower based on geologic conditions, aesthetic benefits such as enhanced drivers' views, and consistency with the regionally preferred alignment and design features as expressed by the MTC. See Chapter 2 of the FEIS for further discussion of the alternative selection process.

6.9.4 Concluding Statement

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the East Span of the SFOBB and the Senior Officers' Quarters Historic District, and the proposed action includes all possible planning to minimize harm to the East Span of the SFOBB and the Senior Officers' Quarters Historic District resulting from such use.

6.10 INDEX OF SECTION 4(f) CORRESPONDENCE

DEIS comment letters that addressed the draft Section 4(f) evaluation
(see Volume II, Section 1, of the FEIS)

- Department of the Interior, December 18, 1998
- City of Oakland Landmarks Preservation Advisory Board, November 23, 1998
- California Preservation Foundation, November 23, 1998
- National Trust for Historic Preservation, November 23, 1998

Other DEIS comment letters that discuss park resources or historic resources
(see Volume II, Section 1, of the FEIS)

- East Bay Regional Park District, October 29, 1998
- City of Oakland Planning Department, November 20, 1998
- U.S. Navy, November 23, 1998
- City and County of San Francisco Planning Department, November 23, 1998

Comment letters on the supplemental draft Section 4(f) evaluation
(see Volume II, Section 3, of the FEIS)

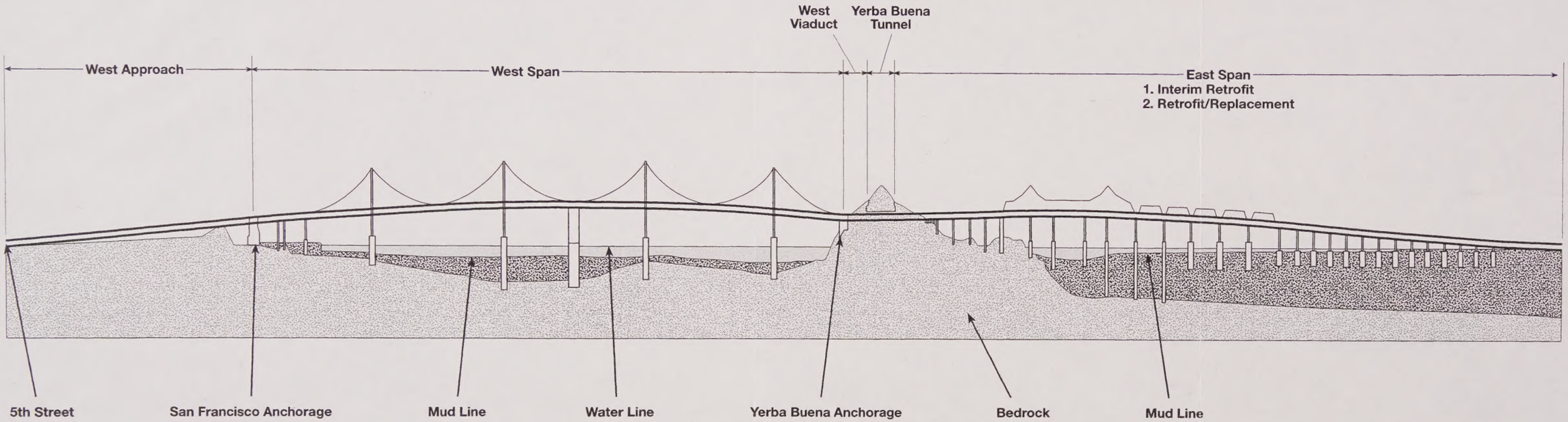
- Department of the Interior, September 2, 1999
- City of Oakland Planning Department, August 18, 1999
- City and County of San Francisco, Treasure Island Project, August 24, 1999
- East Bay Regional Park District, received September 15, 1999

Other Section 4(f) correspondence (see Appendix G of the FEIS)

- U.S. Coast Guard, August 12, 1998
- East Bay Regional Park District, October 29, 1998
- Port of Oakland, April 1, 1999

APPENDIX A
FIGURES

LIST OF FIGURES

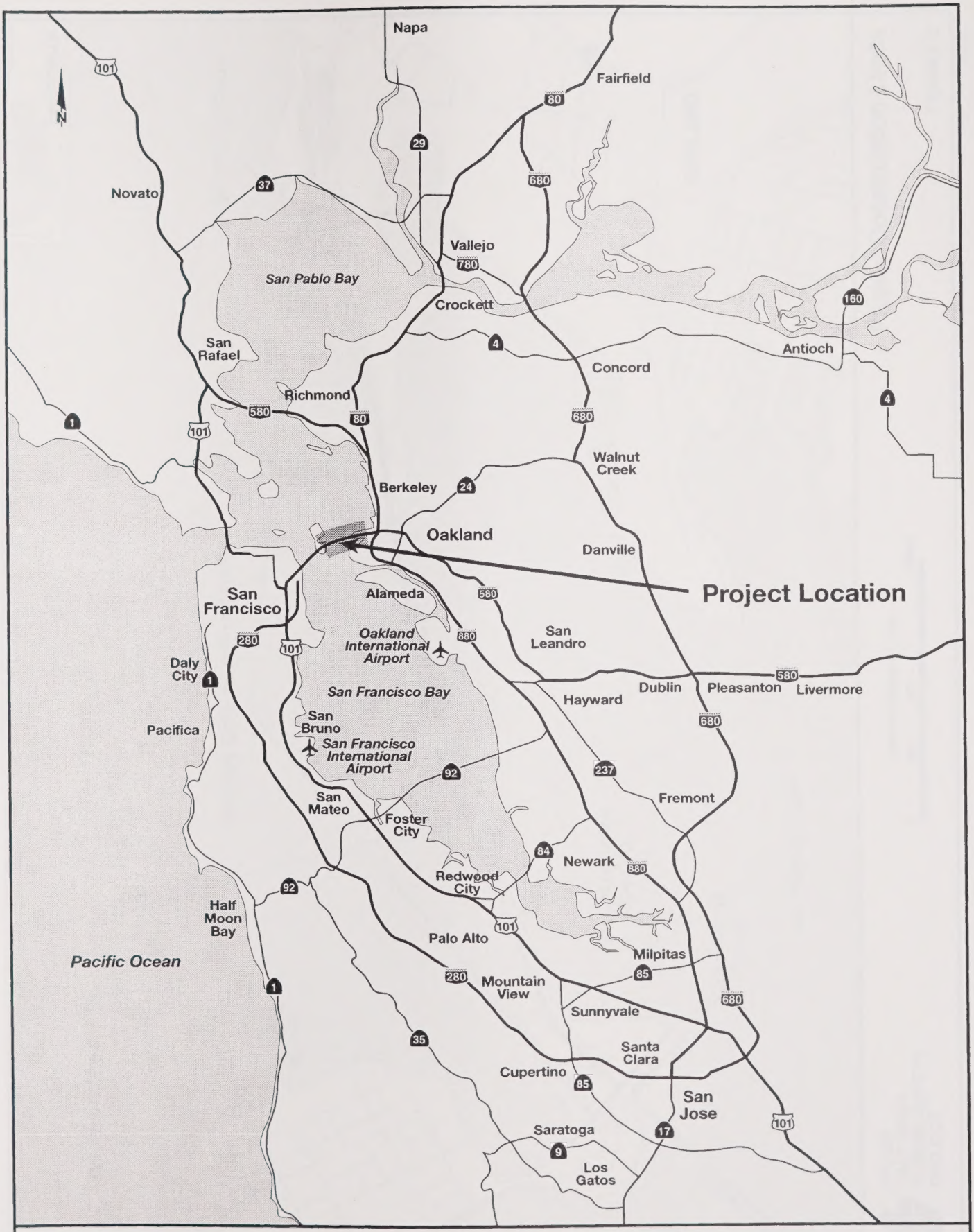


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NO SCALE
VERTICAL EXAGGERATED

San Francisco–Oakland
Bay Bridge–Related Projects
Figure 1-1

4/25/01

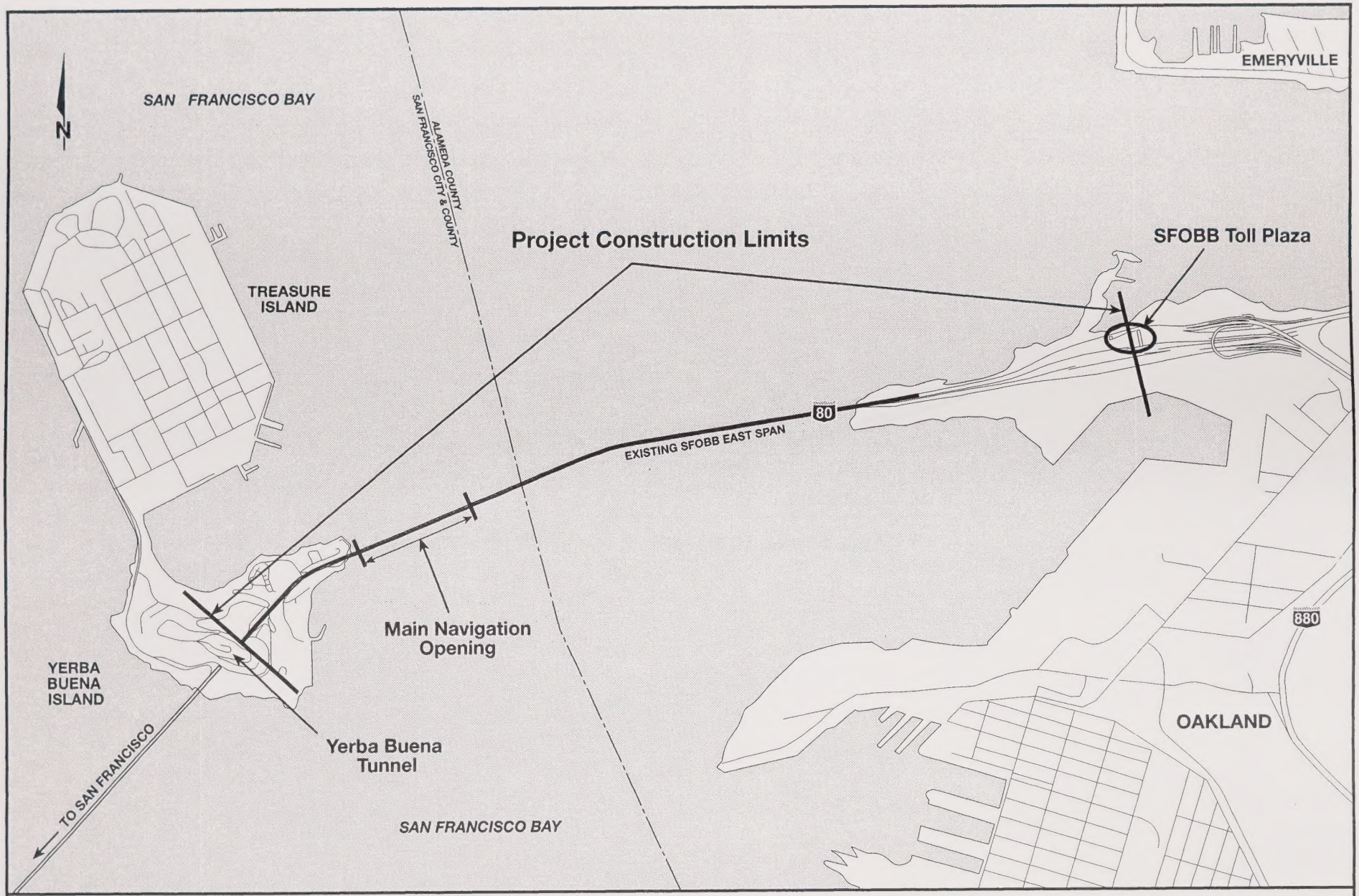


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Project Location

Figure 2-1

10/17/00



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

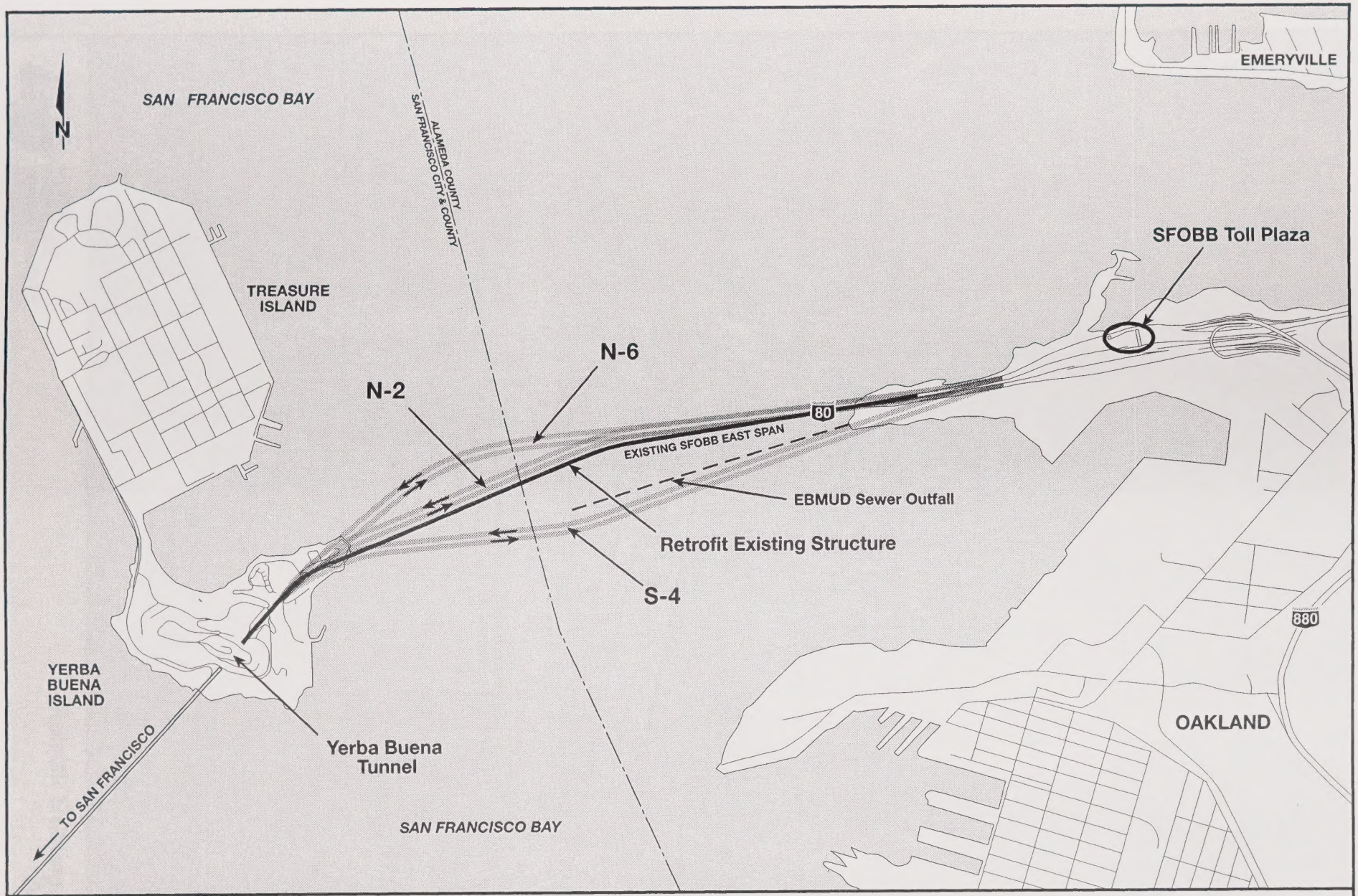
GRAPHIC SCALE 1:27,500

0 250 500 1000 m

Project Construction Limits

Figure 2-2

4/24/01



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

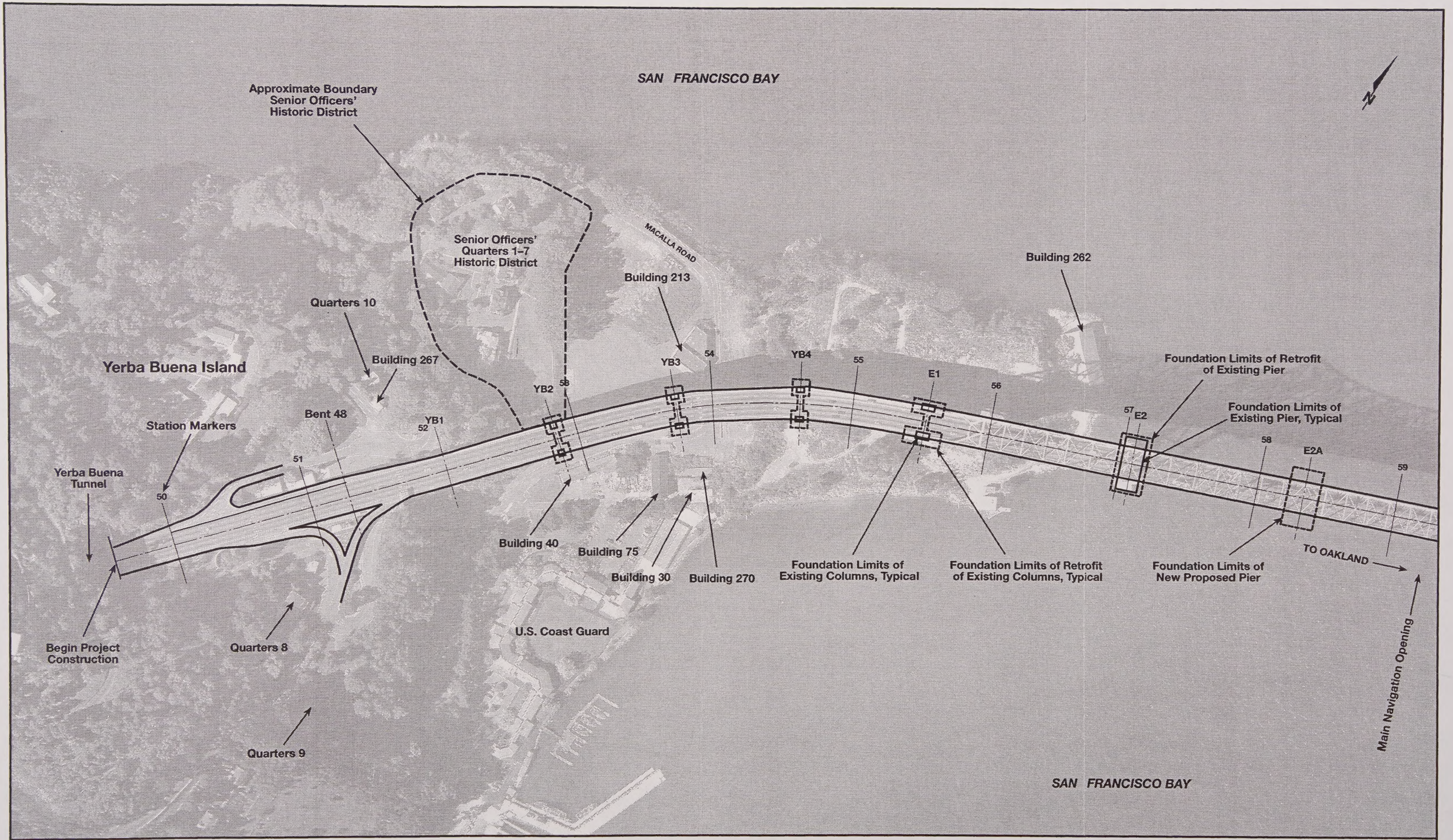
GRAPHIC SCALE 1:27,500

0 250 500 1000 m

Project Alternatives

Figure 2-3

9/4/00



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500

0 100 200 300 m

Retrofit Existing Structure Alternative

Figure 2-4.1

4/24/01

SAN FRANCISCO BAY

Main Navigation Opening

TO YERBA BUENA ISLAND

59 60 E2B 61 E3 62 E4 63 64 E5 65 66 E6 67 E7 68

Foundation Limits of Existing Pier, Typical

TO OAKLAND

Foundation Limits of New Proposed Pier

Foundation Limits of Retrofit of Existing Pier, Typical

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500

0 100 200 300 m

Retrofit Existing Structure Alternative

Figure 2-4.2

4/24/01

SAN FRANCISCO BAY

Foundation Limits of
Existing Pier, Typical

TO YERBA BUENA ISLAND

E8 69 70 E9 71 E10 72 E11 73 E12 74 E13 75 E14 76 E15 77 E16 78 E17 79 E18

TO OAKLAND

Foundation Limits of Retrofit
of Existing Pier, Typical

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500

0 100 200 300 m

Retrofit Existing Structure
Alternative

Figure 2-4.3

2/3/01

SAN FRANCISCO BAY

N

Foundation Limits of
Existing Pier, Typical

TO YERBA BUENA ISLAND

E18 79 E19 80 E20 81 E21 82 E22 83 E23 84

Foundation Limits of Retrofit
of Existing Pier, Typical

PG & E
Substation

Key Pier
Substation

EBMUD
Outfall Structure

Pacific Bell
Switching Station

Bay Bridge
Substation

EBMUD
Dechlorination
Facility

Oakland Touchdown Area

Caltrans Maintenance Road

BURMA ROAD

SAN FRANCISCO BAY

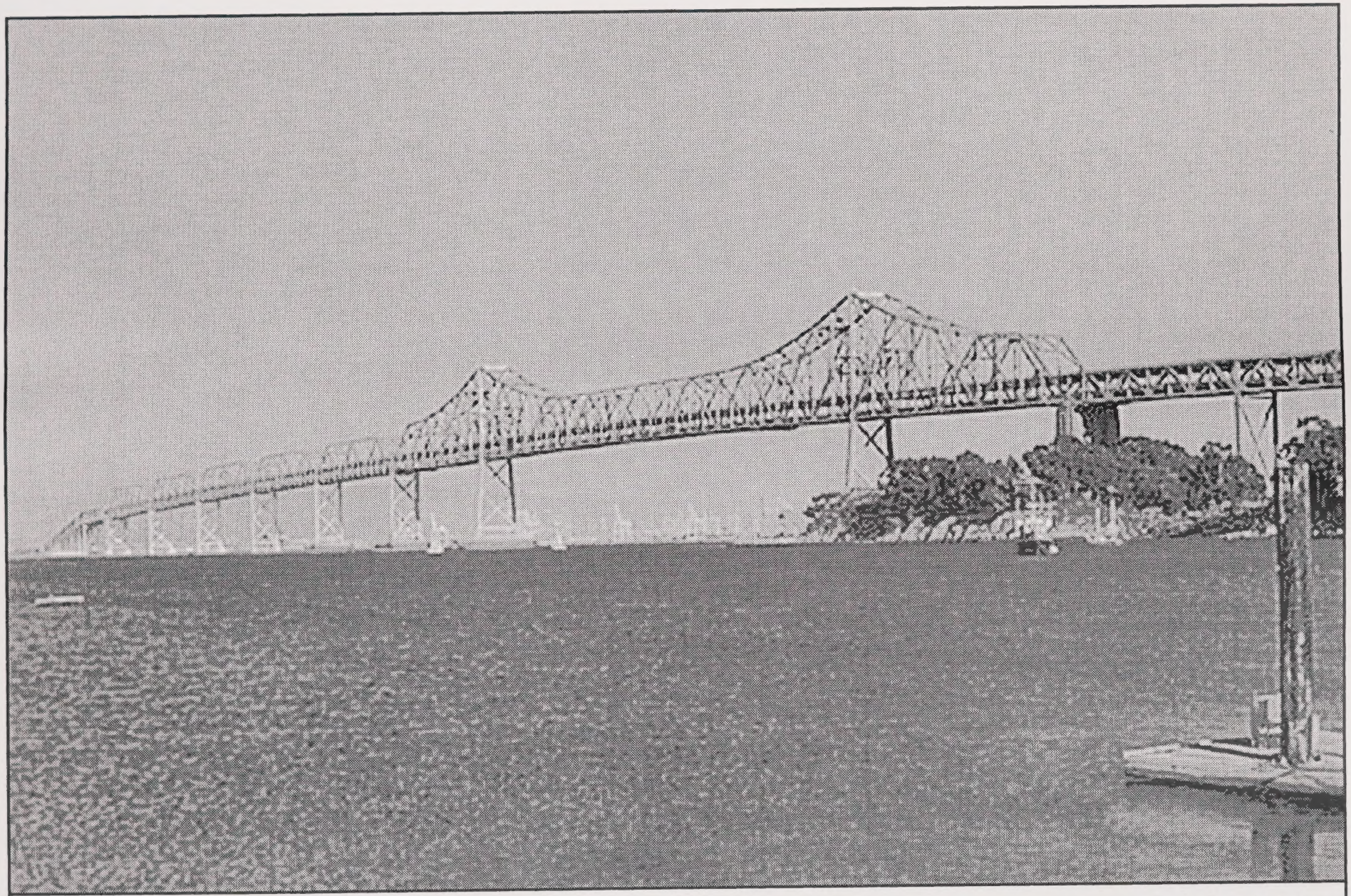
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500

0 100 200 300 m

Retrofit Existing Structure
Alternative
Figure 2-4.4

4/25/01

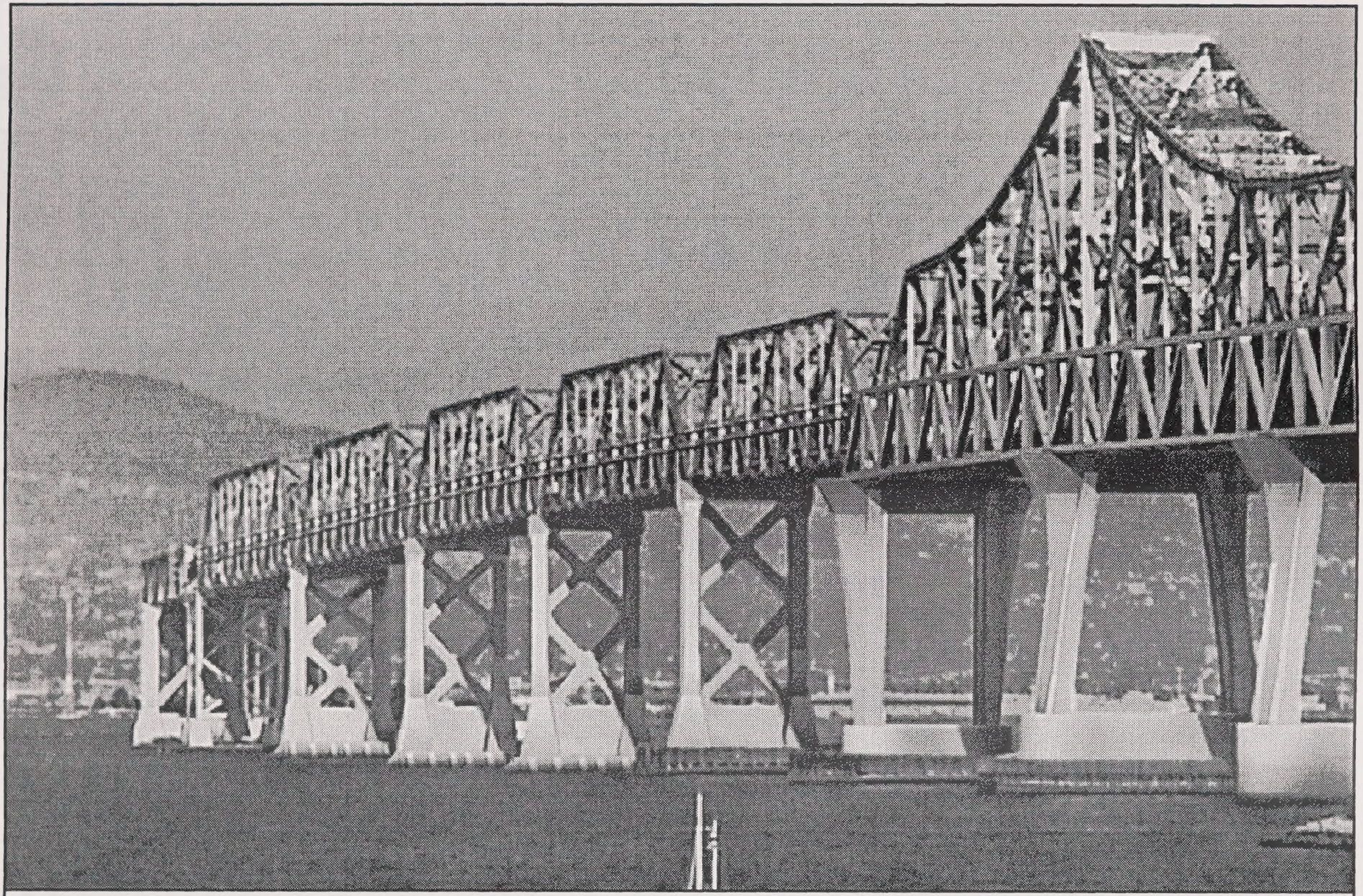


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

View of Existing Bridge
from Treasure Island Viewpoint

Figure 2-5

9/4/00

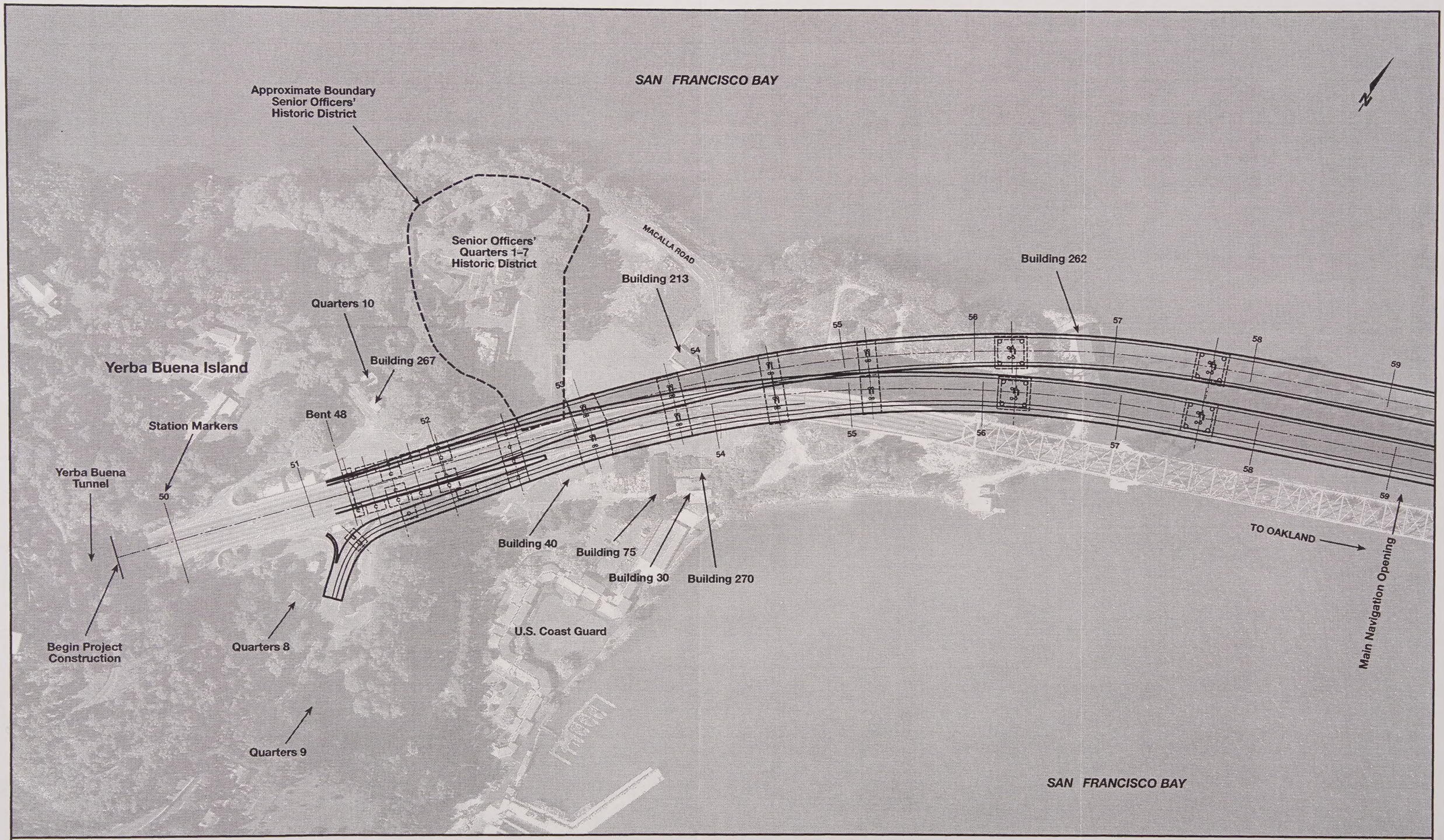


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Photo Simulation Retrofit Existing Bridge Design
from Treasure Island Viewpoint

Figure 2-6

9/4/00



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500

0 100 200 300 m

Replacement Alternative N-2
Suspension/Cable-Stayed Structure Variation

Figure 2-7.1a

4/24/01

SAN FRANCISCO BAY

Approximate Boundary
Senior Officers'
Historic District

Senior Officers'
Quarters 1–7
Historic District

MACALLA ROAD

Building 213

Building 262

Main Navigation Opening

Quarters 10

Building 267

Yerba Buena Island

Bent 48

Station Markers

Yerba Buena
Tunnel

50

51

52

53

54

55

56

57

58

59

Building 40

Building 75

Building 30

Building 270

U.S. Coast Guard

TO OAKLAND

Begin Project
Construction

Quarters 8

Quarters 9

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500

0 100 200 300 m

Replacement Alternative N-2
Skyway Structure Variation
Figure 2-7.1b

4/26/01

SAN FRANCISCO BAY

N

Main Navigation Opening

TO YERBA BUENA ISLAND

59 60 61 62 63 64 65 66 67 68 69

Proposed Foundation Limits–
Main Tower Support

TO OAKLAND

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500

0 100 200 300 m

Replacement Alternative N-2
Suspension Structure Variation

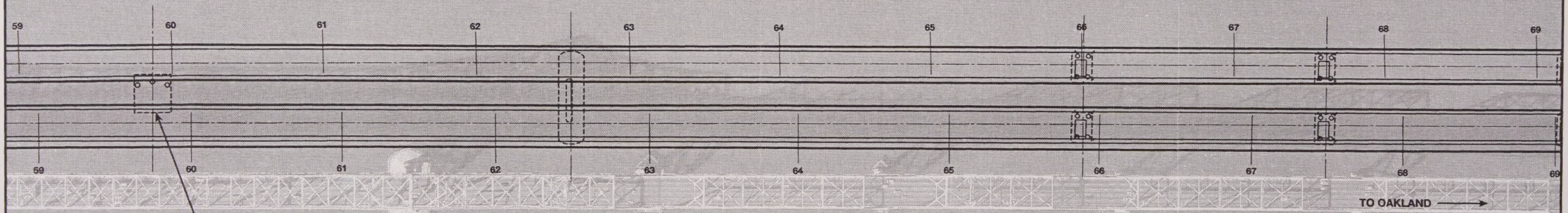
Figure 2-7.2a

4/24/01

SAN FRANCISCO BAY

Main Navigation Opening

TO YERBA BUENA ISLAND



Proposed Foundation Limits–
Main Tower Support

TO OAKLAND

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500

0 100 200 300 m

Replacement Alternative N-2
Cable-Stayed Structure Variation

Figure 2-7.2b

4/24/01

SAN FRANCISCO BAY

Main Navigation Opening

59 60 61 62 63 64 65 66 67 68 69

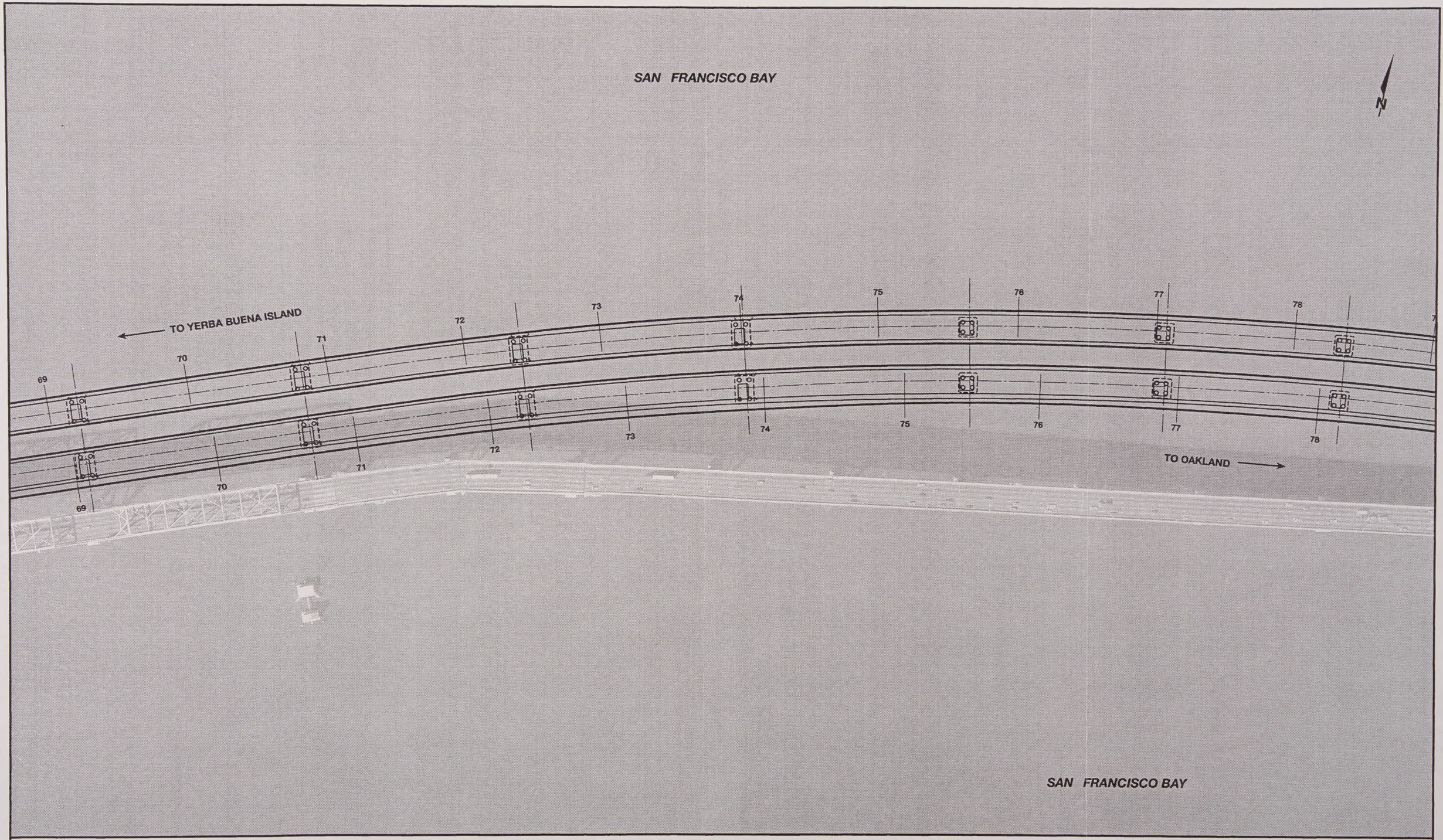
SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-2
Skyway Structure Variation
Figure 2-7.2c

4/24/01

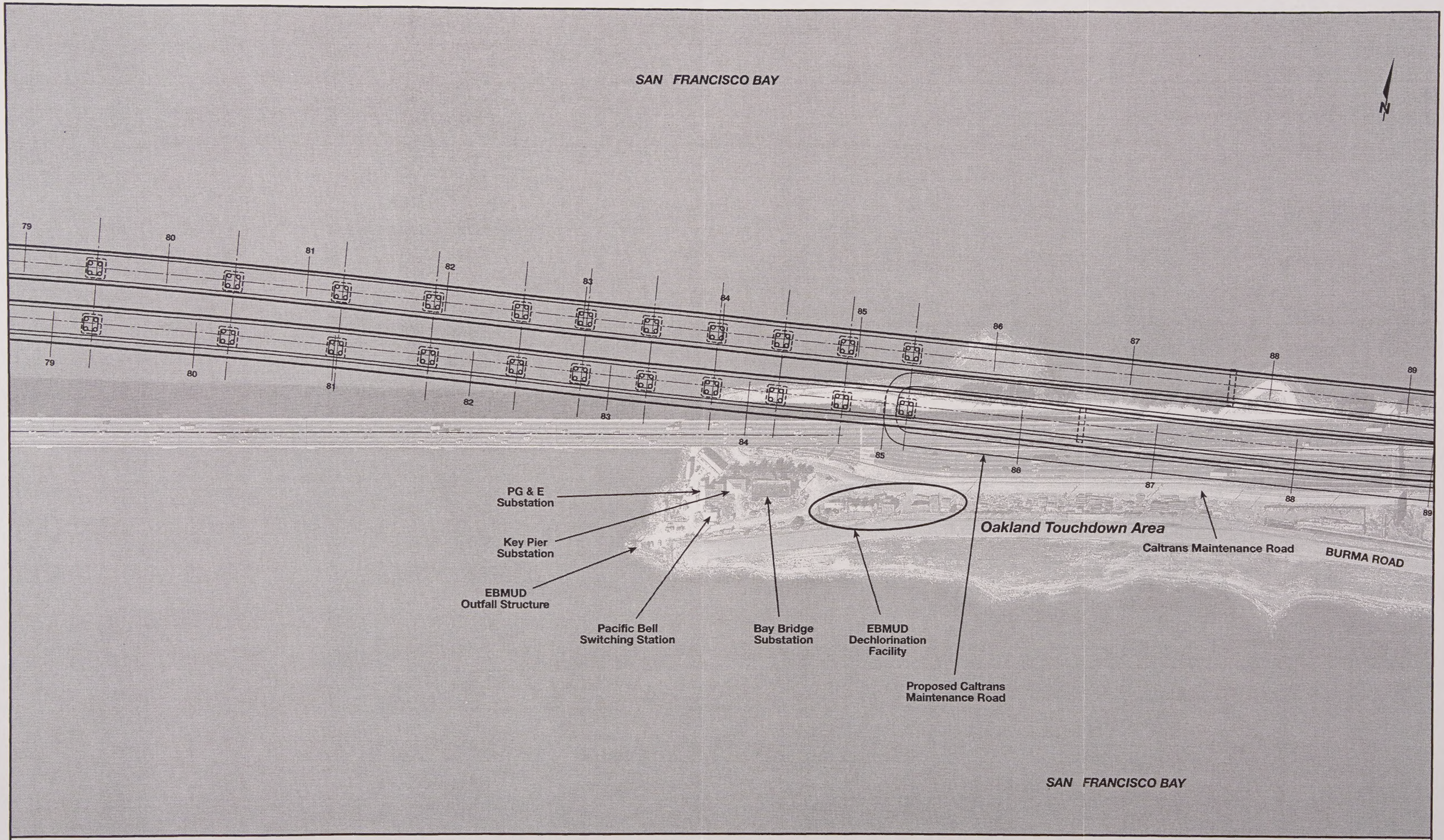


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-2
All Design Variations
Figure 2-7.3

2/3/01

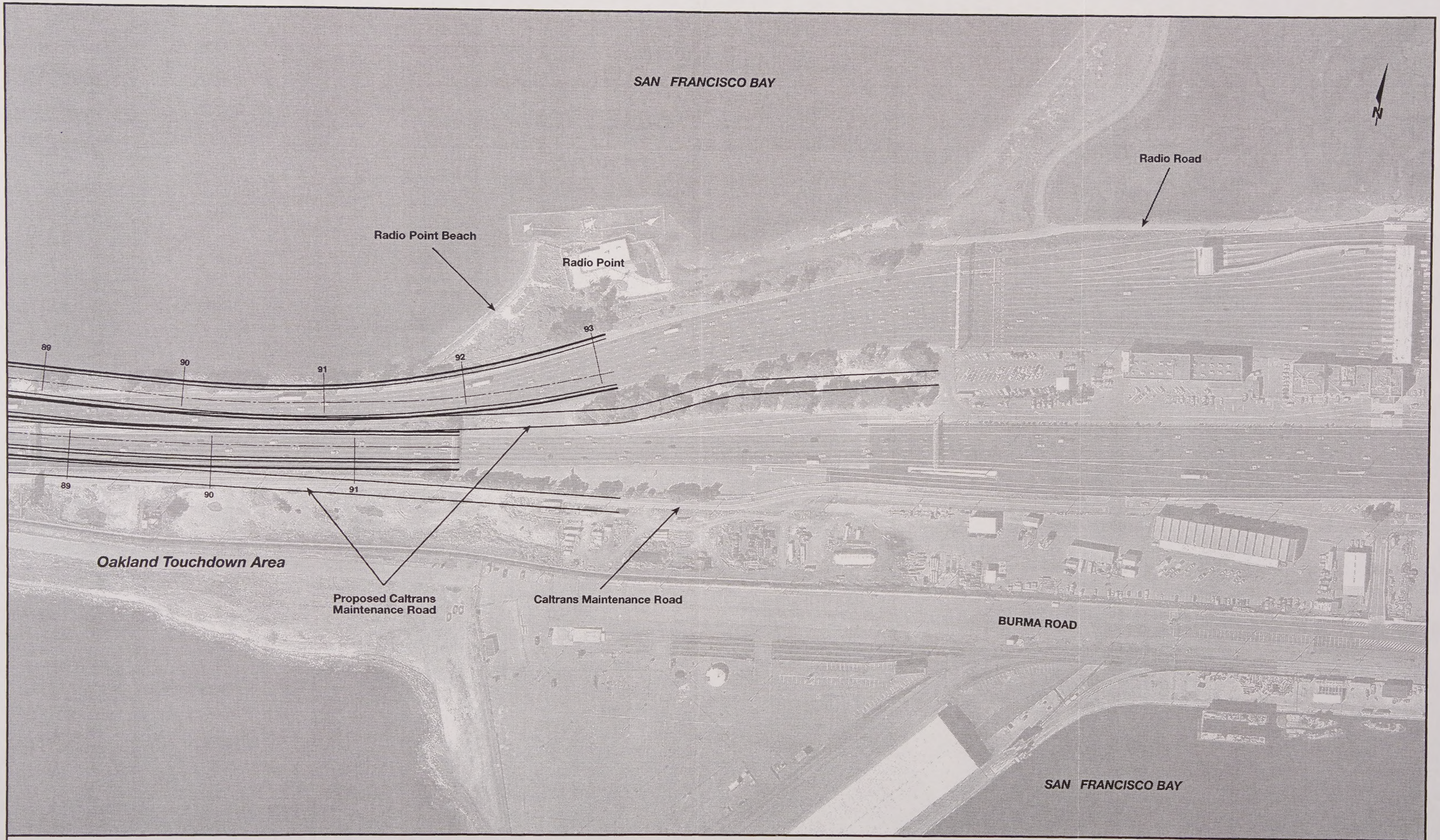


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-2
All Design Variations
Figure 2-7.4

4/26/01

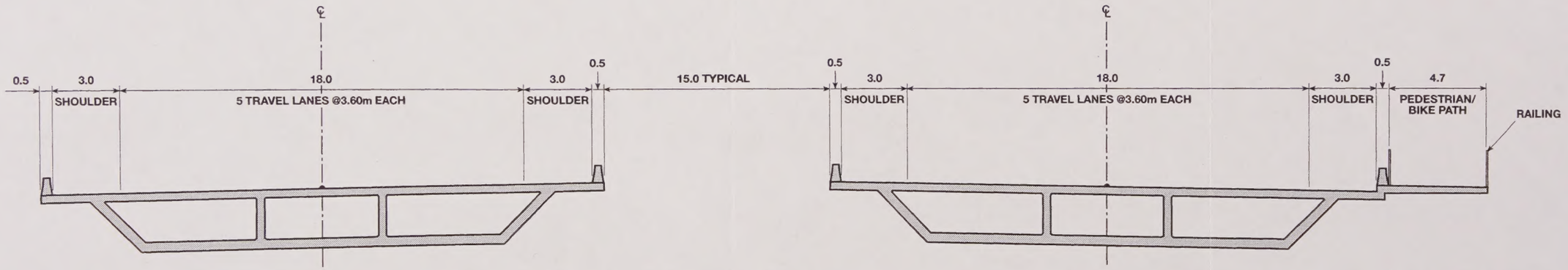


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-2
All Design Variations
Figure 2-7.5

3/2/01



Westbound Roadway

Eastbound Roadway, with Pedestrian/Bike Path

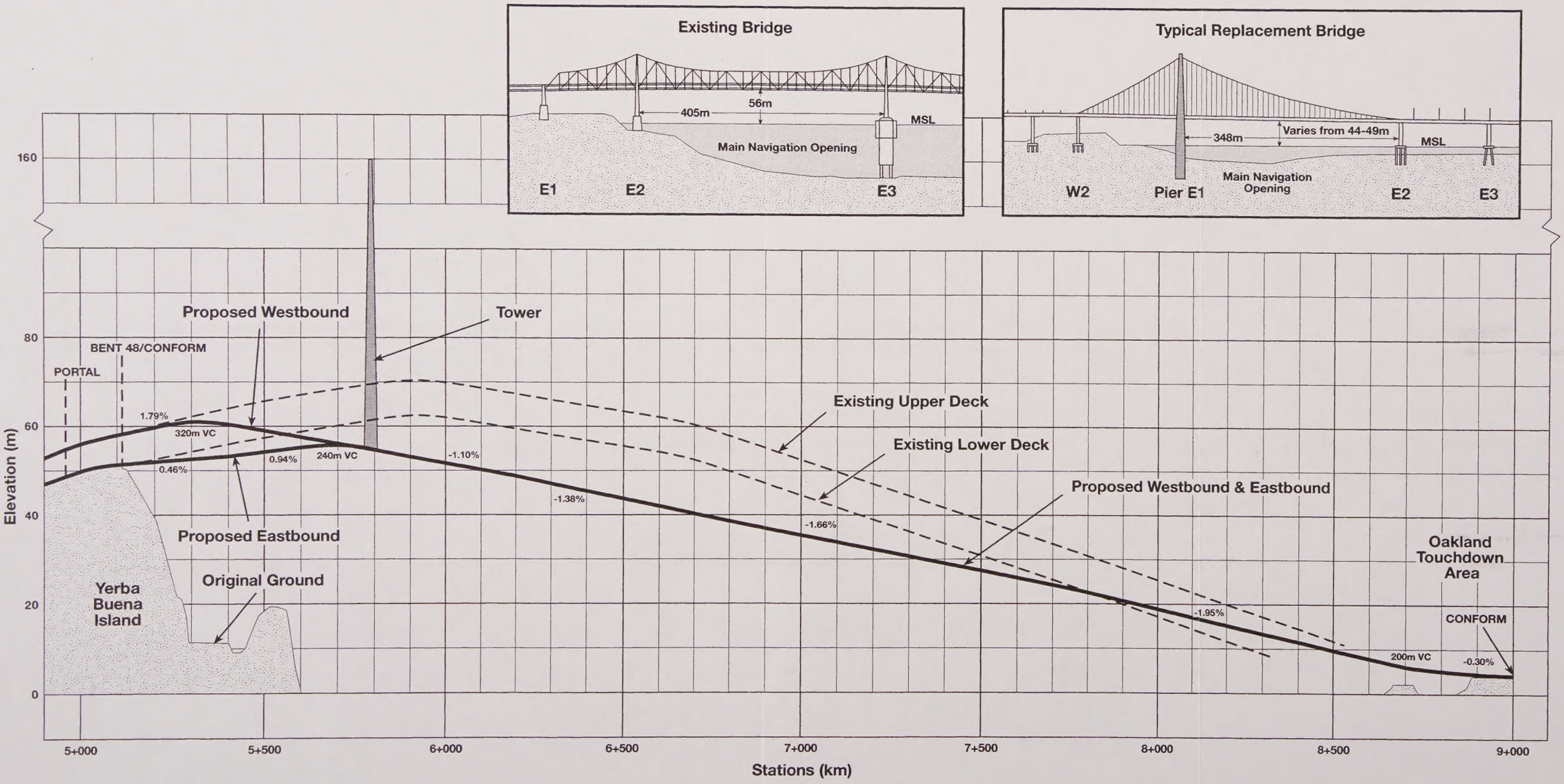
Note: Units in Meters

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Typical Cross Sections

Figure 2-8

2/3/01



Note: VC=Vertical Curve

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NO SCALE

Typical Profile for All Replacement Alternatives

Figure 2-9

4/25/01

SAN FRANCISCO BAY

Approximate Boundary
Senior Officers'
Historic District

Senior Officers'
Quarters 1–7
Historic District

MACALLA ROAD

Proposed Foundation Limits–
Main Tower Support

Building 262

Building 213

Quarters 10

Building 267

Yerba Buena Island

Bent 48

Station Markers

Yerba Buena
Tunnel

50 51 52 53 54 55 56 57 58 59

TO OAKLAND

Building 40

Building 75

Building 30

Building 270

Main Navigation Opening

U.S. Coast Guard

Begin Project
Construction

Quarters 8

Quarters 9

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

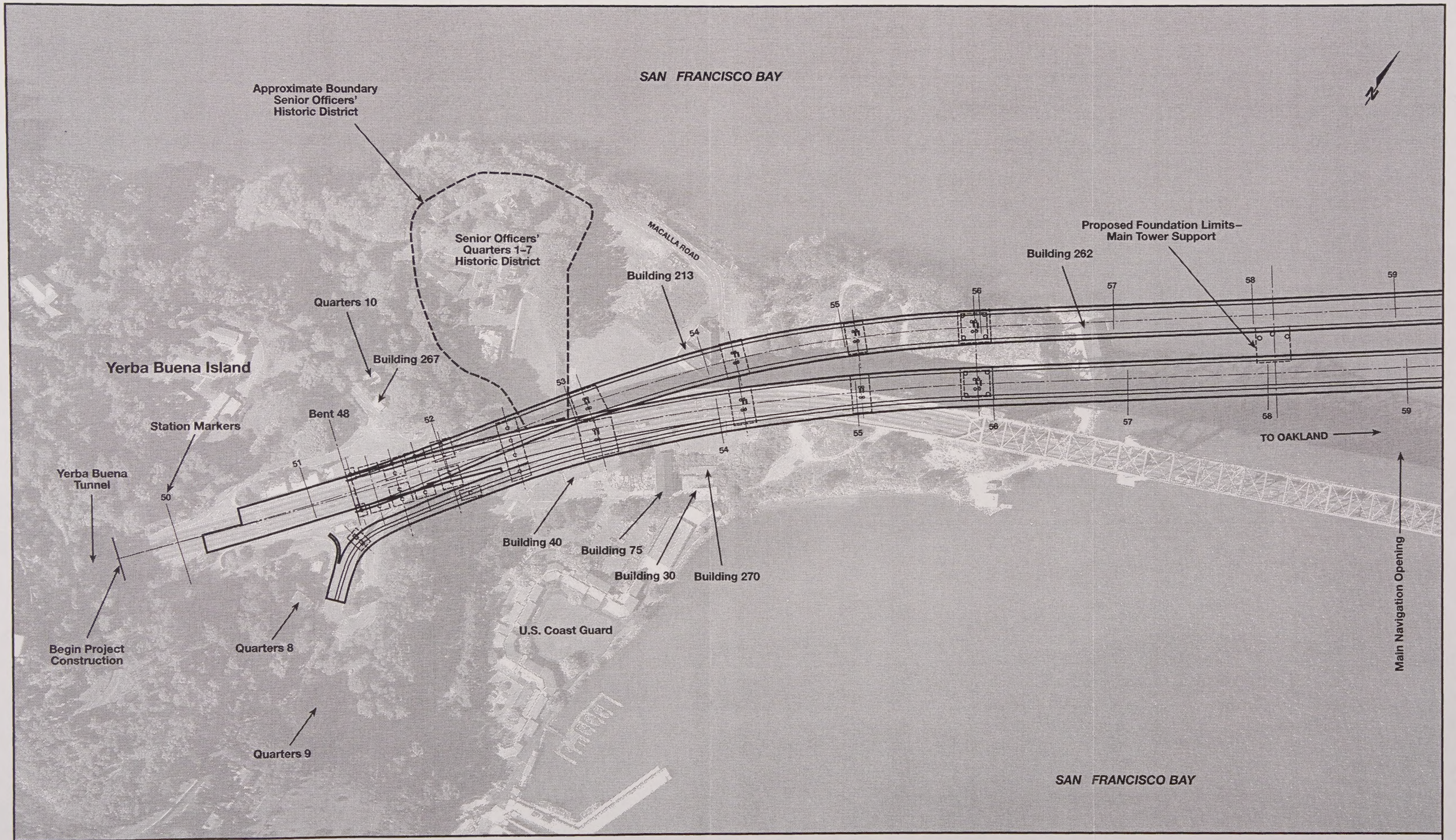
GRAPHIC SCALE 1:2,500

0 100 200 300 m

Replacement Alternative N-6
Suspension Structure Variation

Figure 2-10.1a

4/24/01

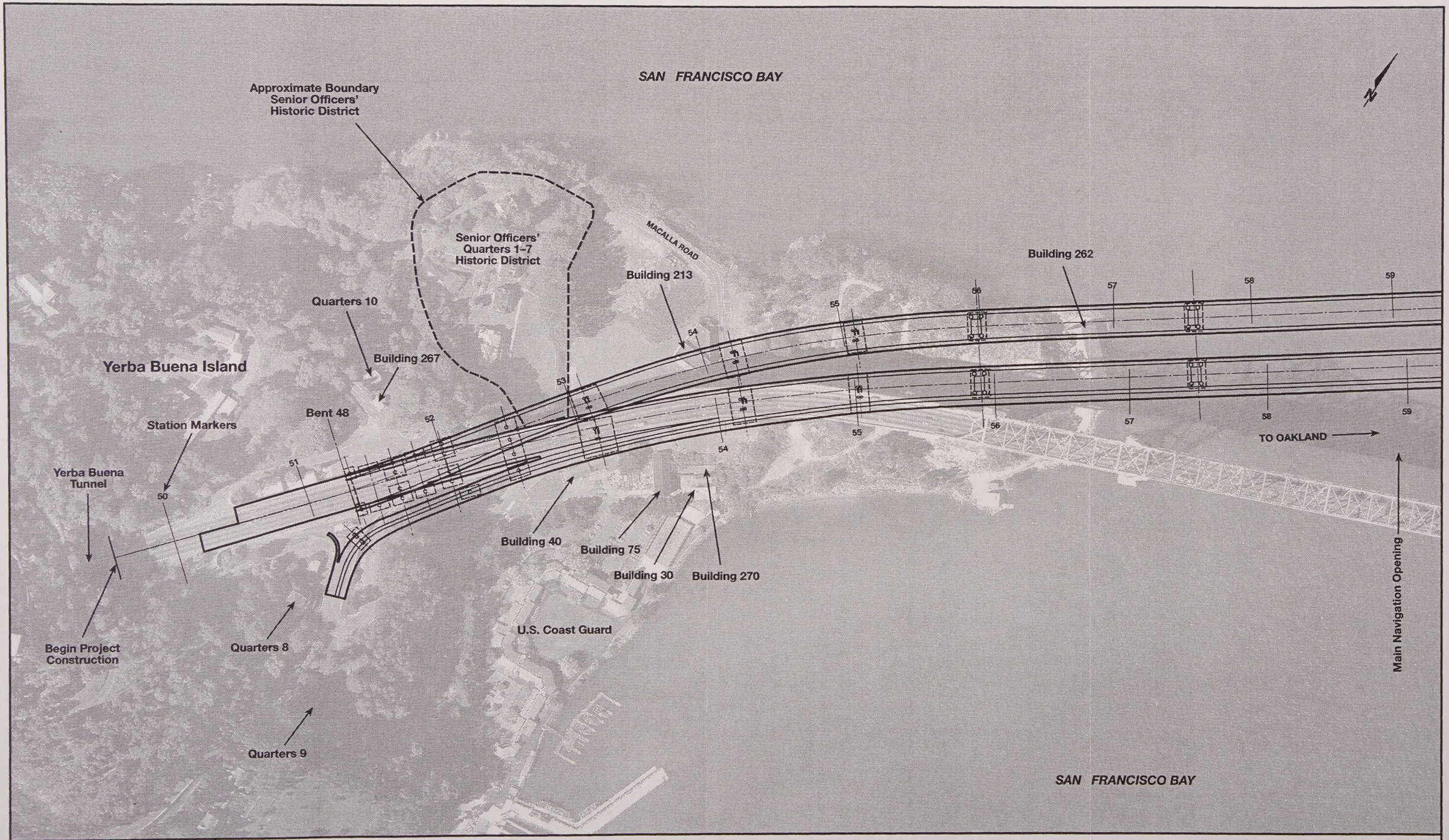


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-6
Cable-Stayed Structure Variation
Figure 2-10.1b

4/24/01

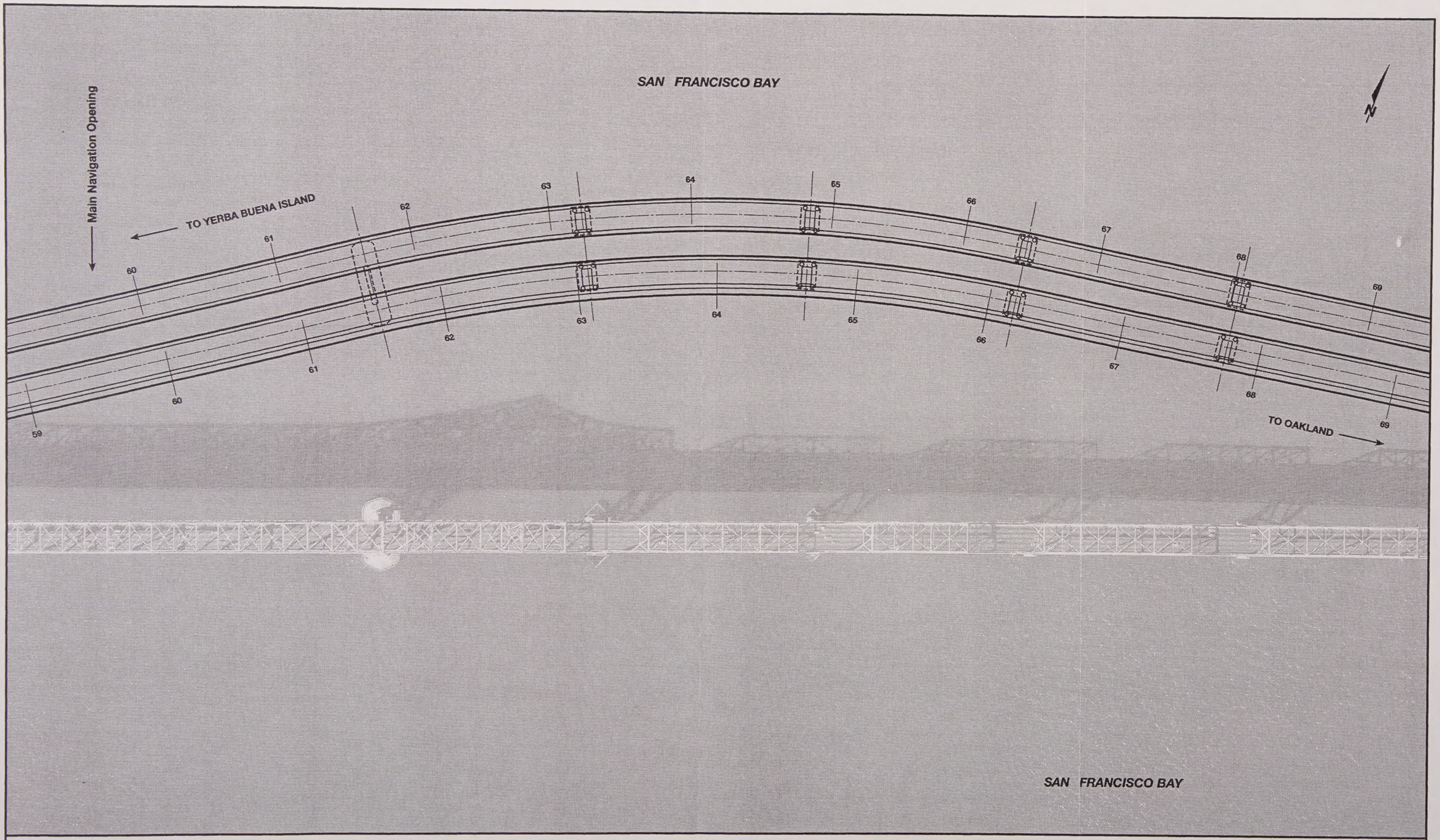


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-6
Skyway Structure Variation
Figure 2-10.1c

4/24/01

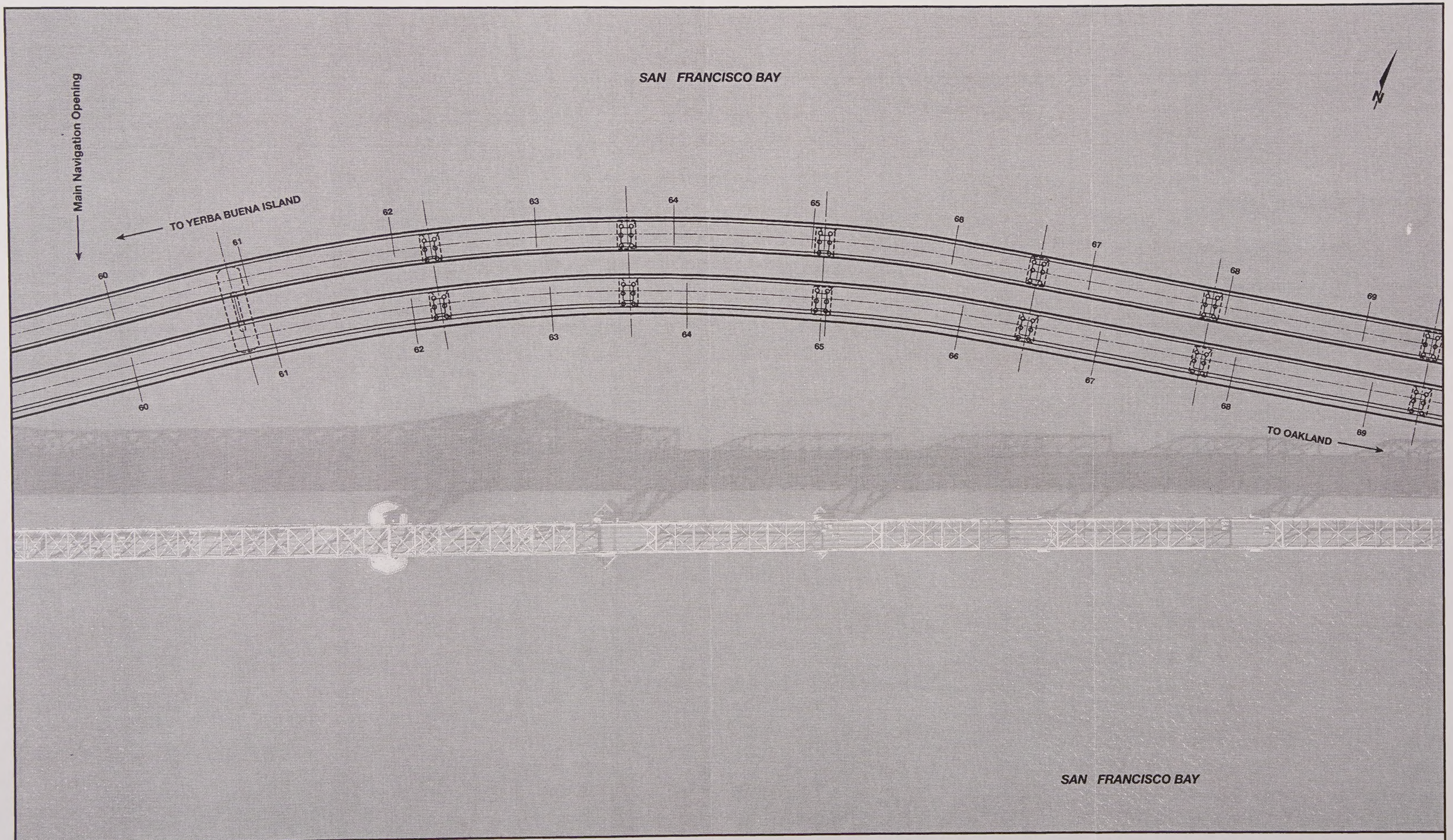


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-6
Suspension Structure Variation
Figure 2-10.2a

4/24/01



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-6
Cable-Stayed Structure Variation
Figure 2-10.2b

4/24/01

SAN FRANCISCO BAY

Main Navigation Opening

TO YERBA BUENA ISLAND

59 60 61 62 63 64 65 66 67 68 69

TO OAKLAND

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-6
Skyway Structure Variation
Figure 2-10.2c

4/24/01

SAN FRANCISCO BAY

N

TO YERBA BUENA ISLAND

69 70 71 72 73 74 75 76 77 78 79

TO OAKLAND

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-6
Suspension/Skyway Structure Variation
Figure 2-10.3a

2/3/01

SAN FRANCISCO BAY

N

TO YERBA BUENA ISLAND

69 70 71 72 73 74 75 76 77 78 79

TO OAKLAND

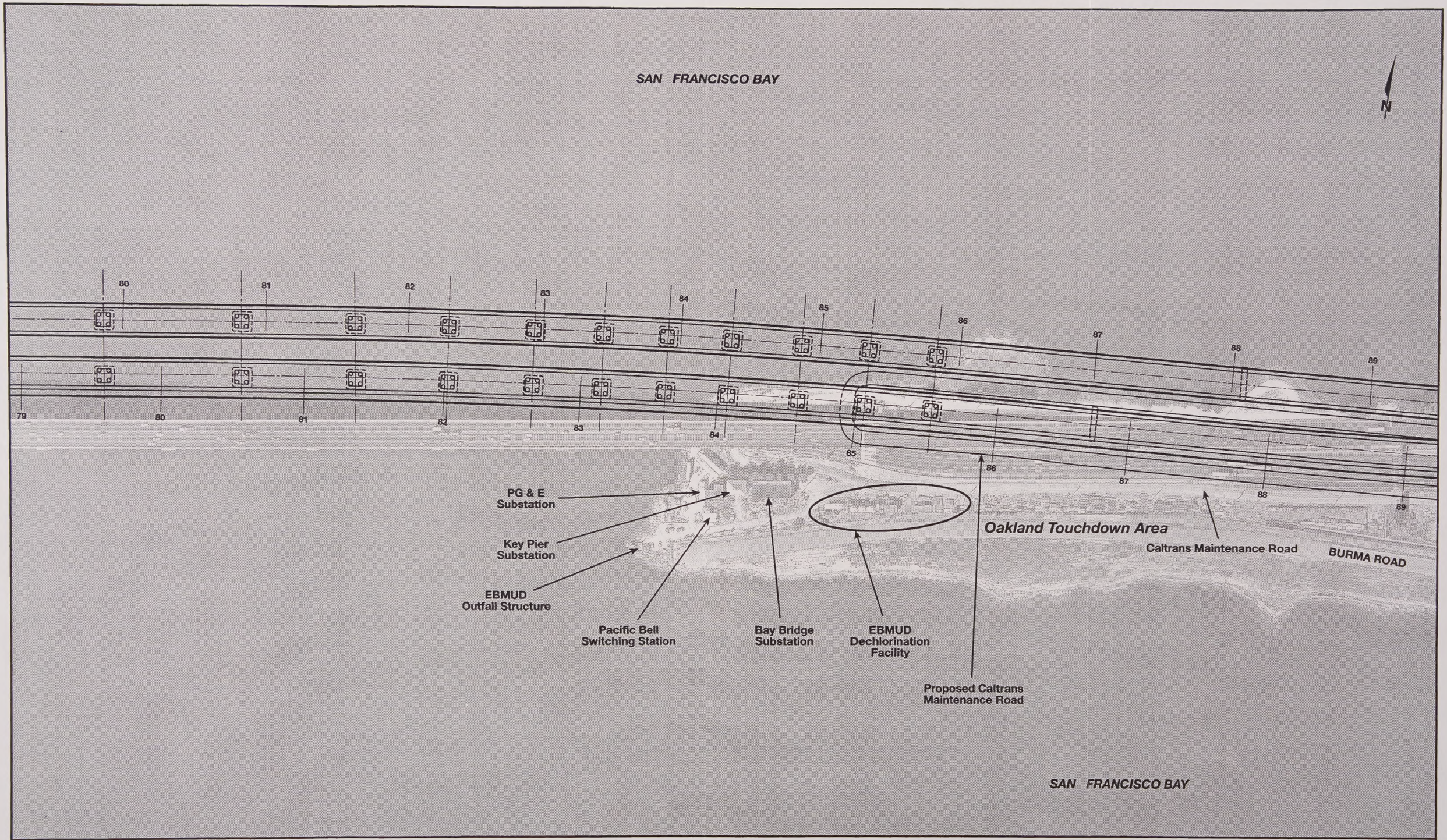
SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-6
Cable-Stayed Structure Variation
Figure 2-10.3b

2/3/01



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

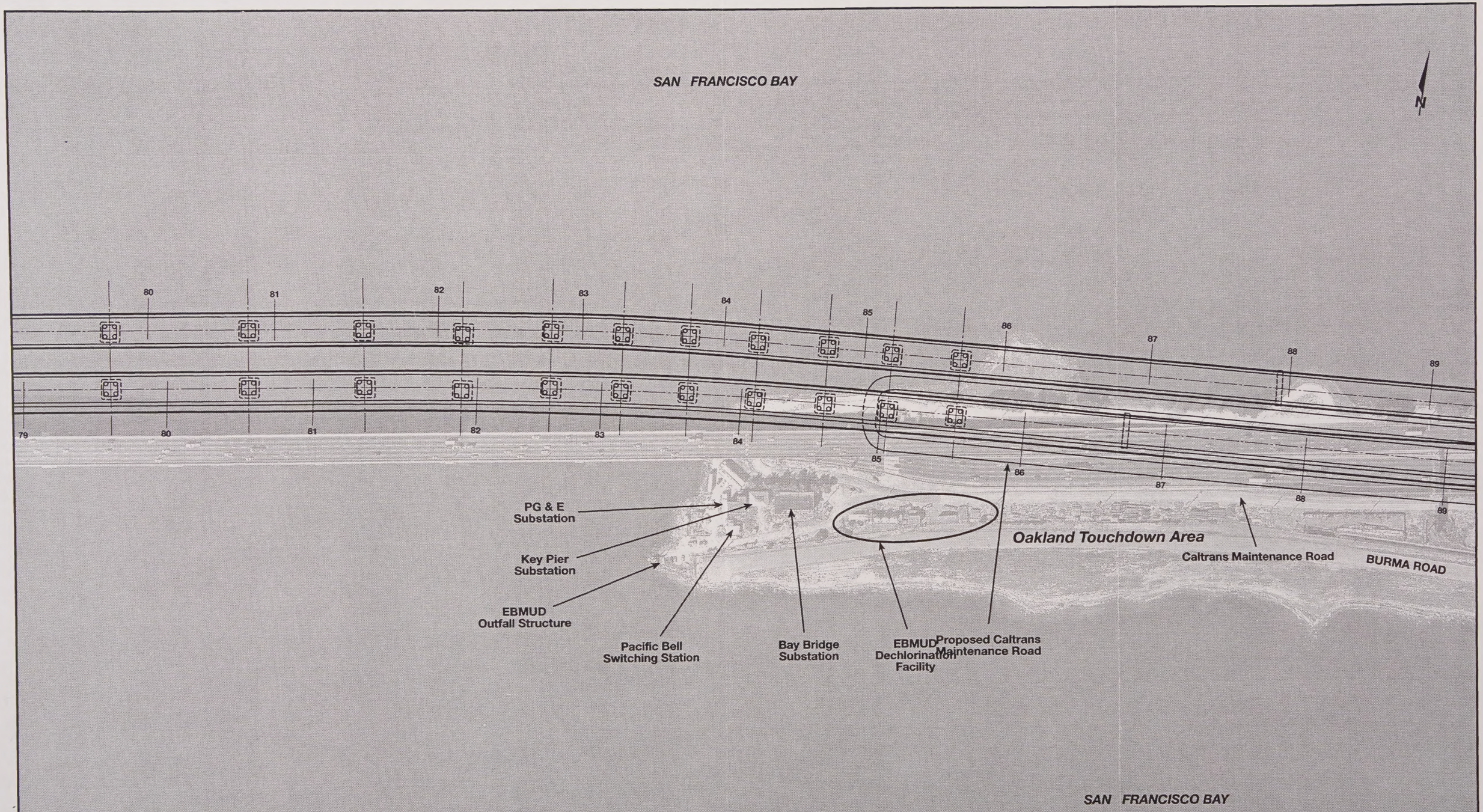
GRAPHIC SCALE 1:2,500

0 100 200 300 m

Replacement Alternative N-6
Suspension/Skyway Structure Variation

Figure 2-10.4a

4/26/01



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500

0 100 200 300 m

Replacement Alternative N-6
Cable-Stayed Structure Variation
Figure 2-10.4b

4/25/01

SAN FRANCISCO BAY

N

Radio Road

Radio Point Beach

Radio Point

90

91

92

92

89

90

91

92

Oakland Touchdown Area

Proposed Caltrans Maintenance Road

Caltrans Maintenance Road

BURMA ROAD

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

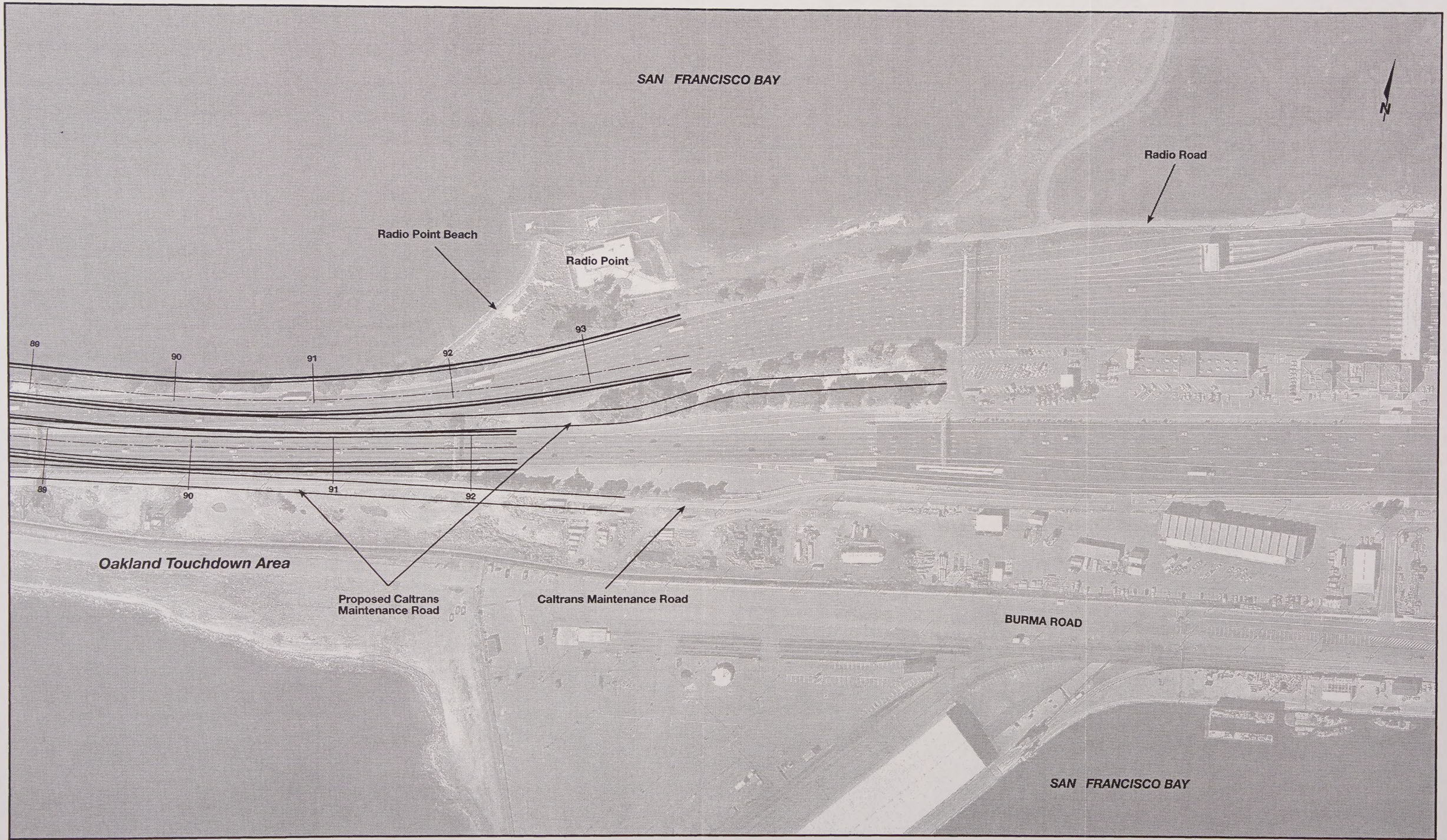
GRAPHIC SCALE 1:2,500

0 100 200 300 m

Replacement Alternative N-6
Suspension/Skyway Structure Variation

Figure 2-10.5a

2/3/01

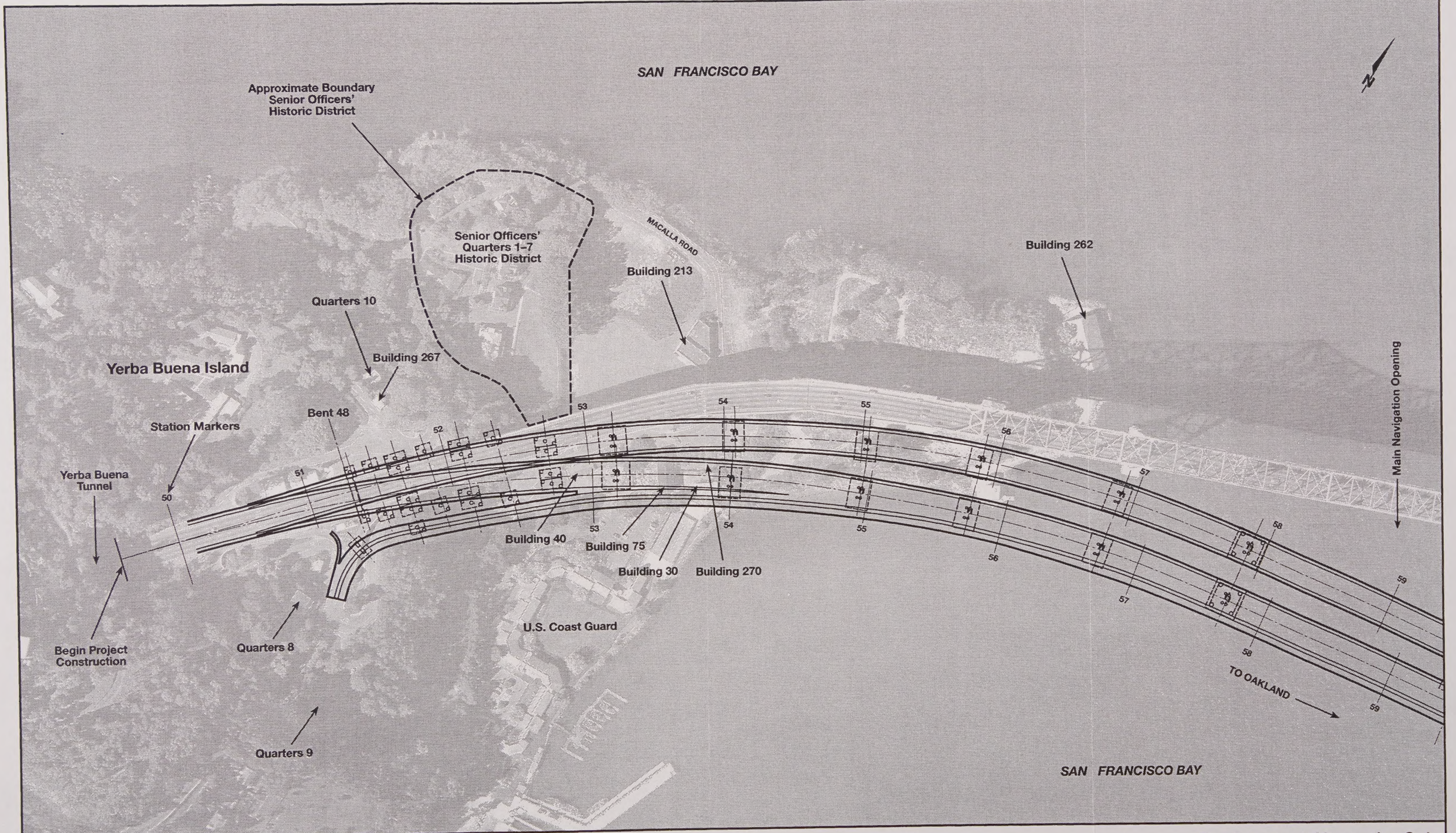


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative N-6
Cable-Stayed Structure Variation
Figure 2-10.5b

2/3/01

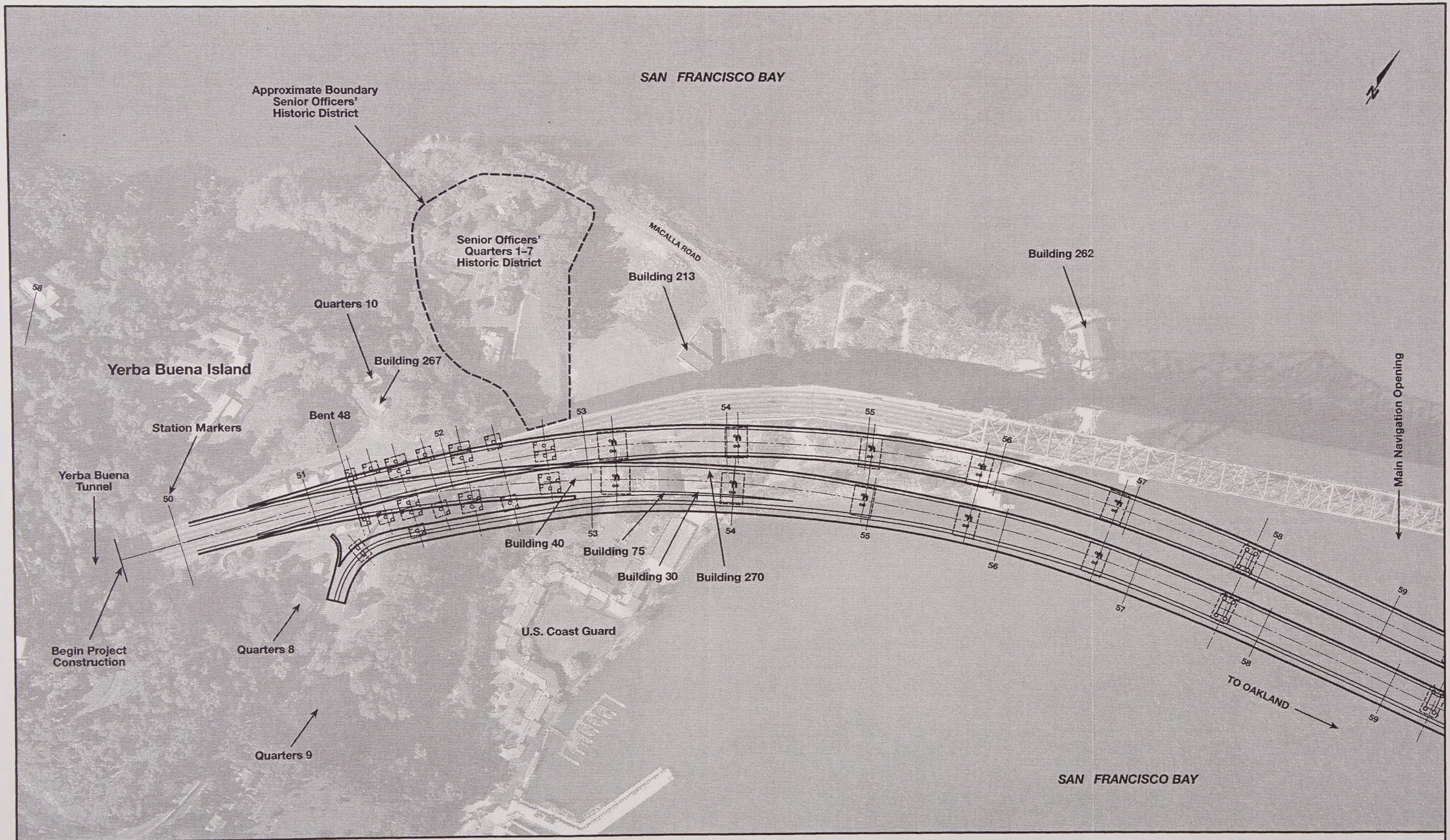


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative S-4
Suspension Structure Variation
Figure 2-11.1a

4/25/01

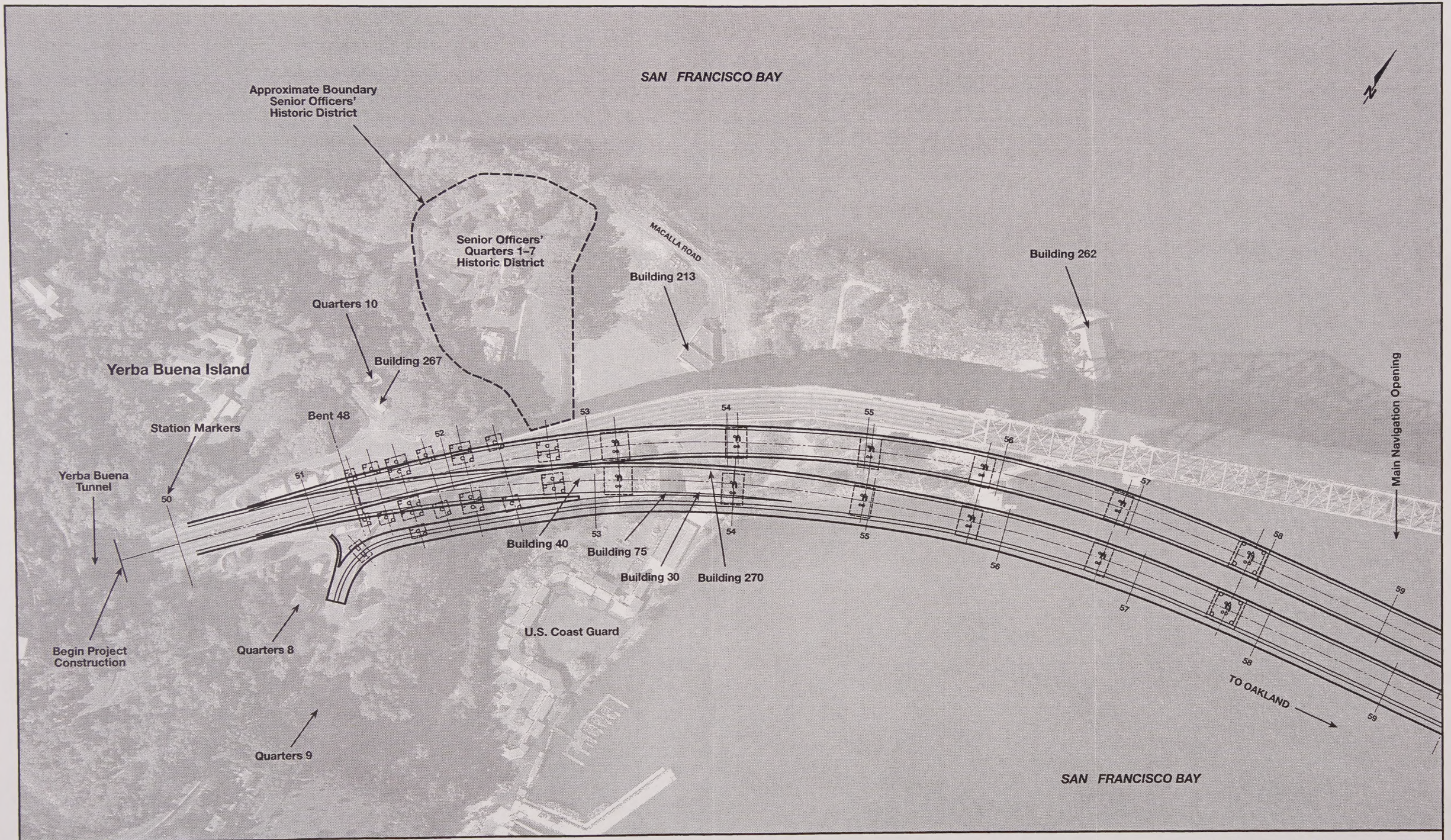


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative S-4
Skyway Structure Variation
Figure 2-11.1b

4/25/01



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500

0 100 200 300 m

Replacement Alternative S-4
Cable-Stayed Structure Variation

Figure 2-11.1c

4/25/01

SAN FRANCISCO BAY

N

TO YERBA BUENA ISLAND

58 59 60 61 62 63 64 65 66 67 68

Proposed Foundation Limits–
Main Tower Support

Main Navigation Opening

TO OAKLAND

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative S-4
Suspension Structure Variation

Figure 2-11.2a

4/25/01

SAN FRANCISCO BAY

TO YERBA BUENA ISLAND

Main Navigation Opening

Proposed Foundation Limits–
Main Tower Support

TO OAKLAND

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative S-4
Cable-Stayed Structure Variation
Figure 2-11.2b

4/25/01

SAN FRANCISCO BAY

N

TO YERBA BUENA ISLAND

58 59 60 61 62 63 64 65 66 67

Main Navigation Opening

TO OAKLAND

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

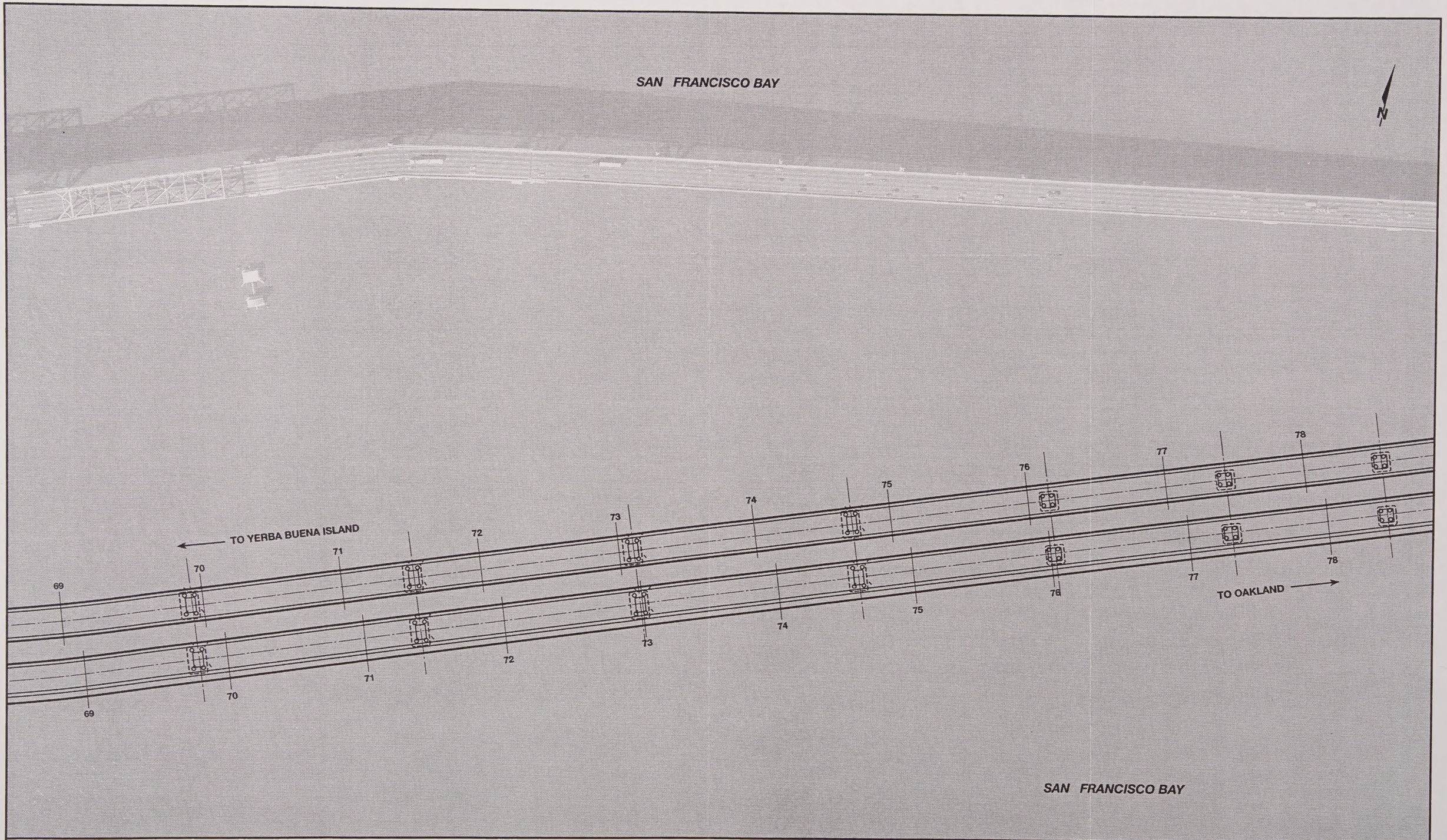
GRAPHIC SCALE 1:2,500

0 100 200 300 m

Replacement Alternative S-4
Skyway Structure Variation

Figure 2-11.2c

4/25/01



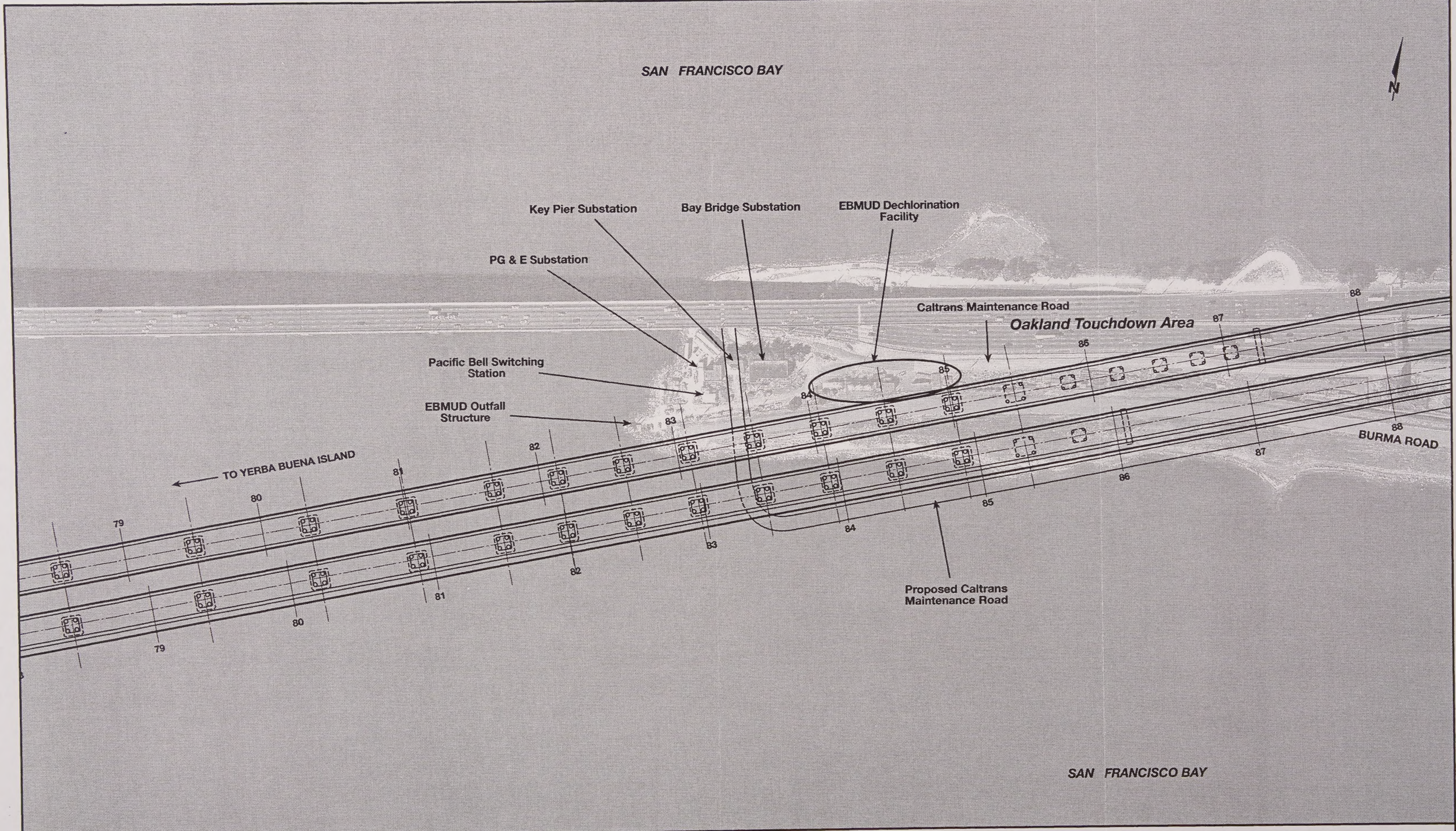
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative S-4
All Design Variations

Figure 2-11.3

2/3/01

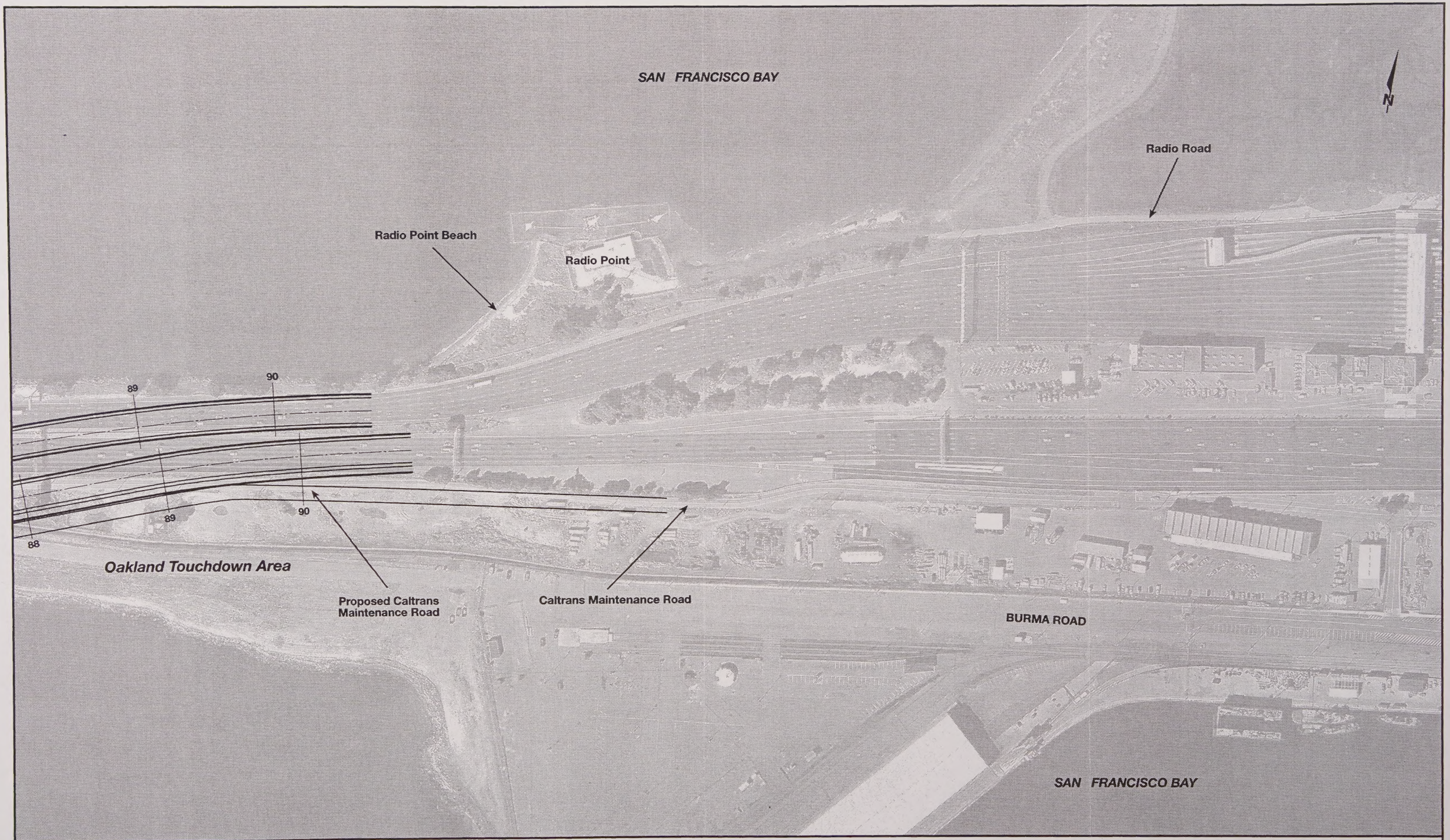


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative S-4
All Design Variations
Figure 2-11.4

4/25/01

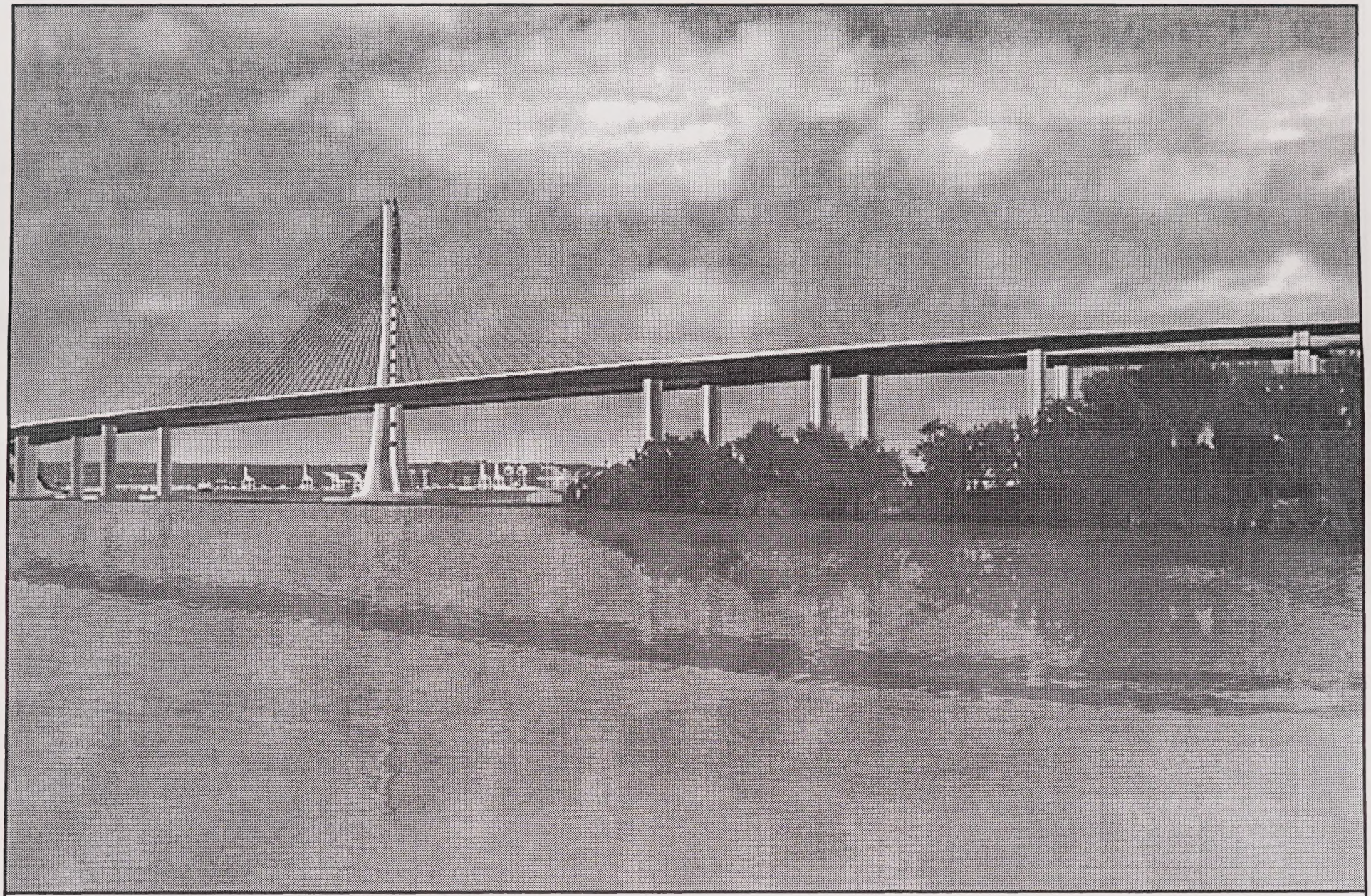


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,500
0 100 200 300 m

Replacement Alternative S-4
All Design Variations
Figure 2-11.5

2/3/01

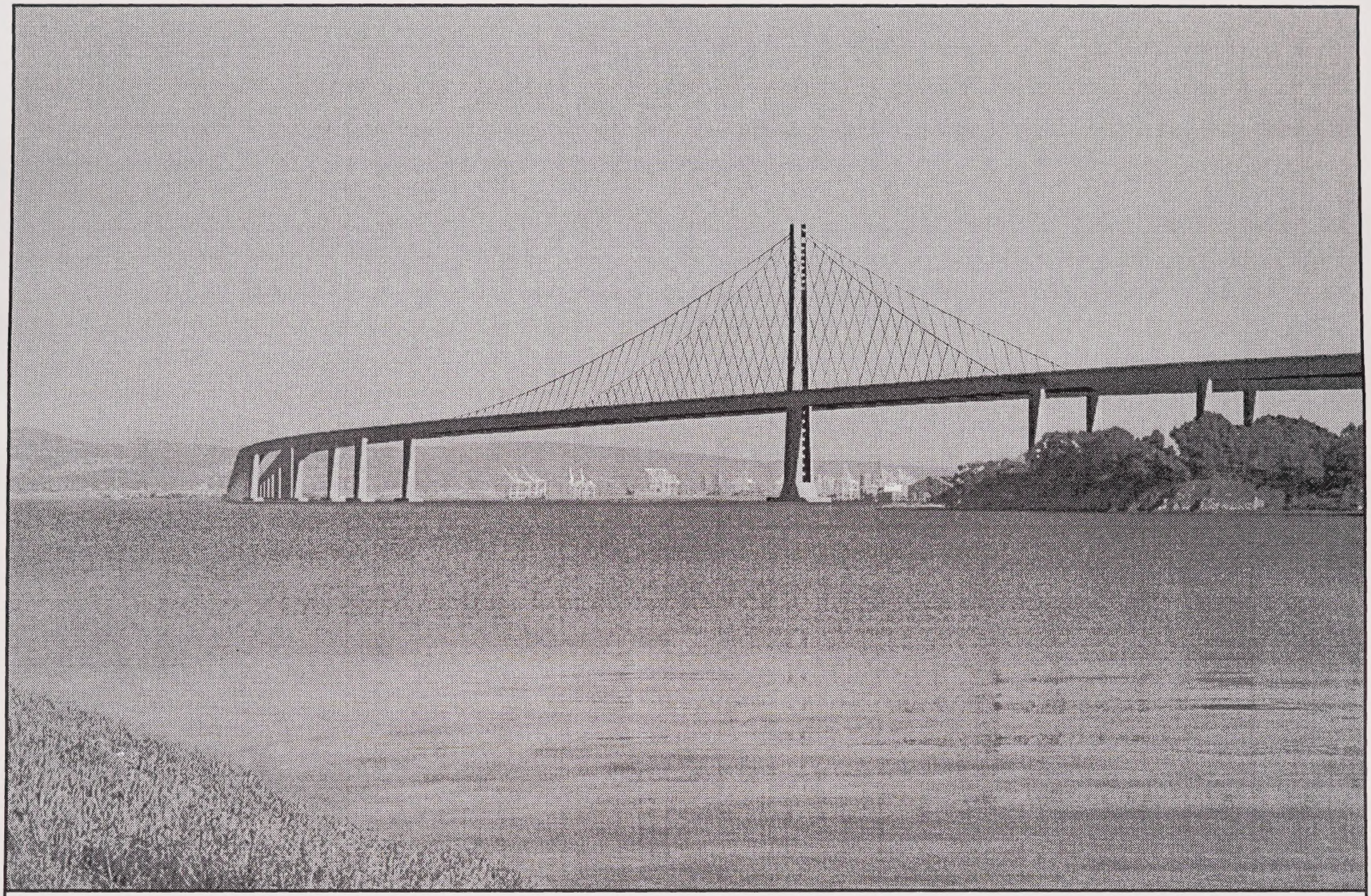


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Cable-Stayed Bridge Design

Figure 2-12

3/2/99



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Self Anchored Suspension Bridge Design

Figure 2-13

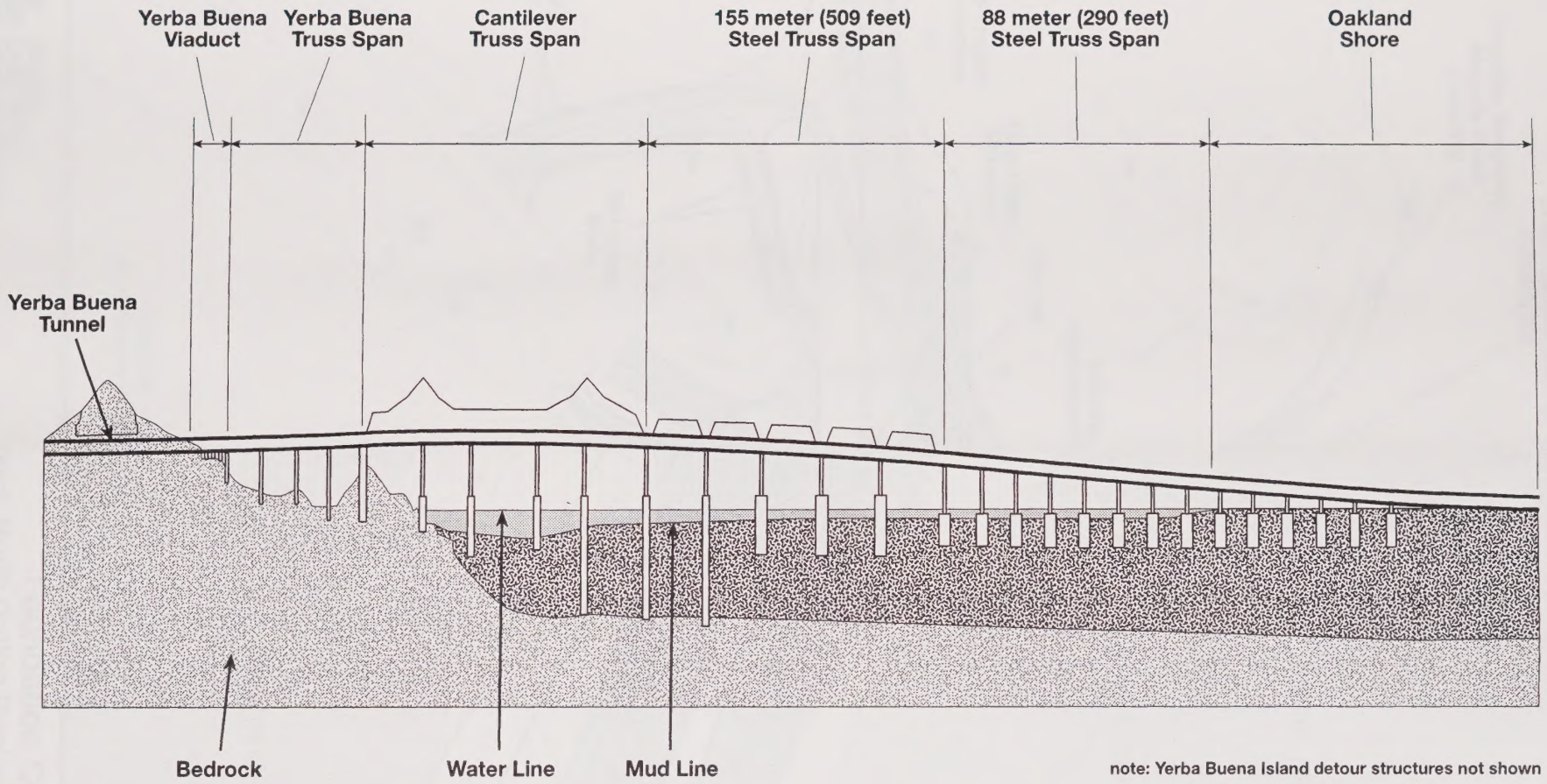
2/7/01

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Skyway Bridge Design

Figure 2-14

9/8/98

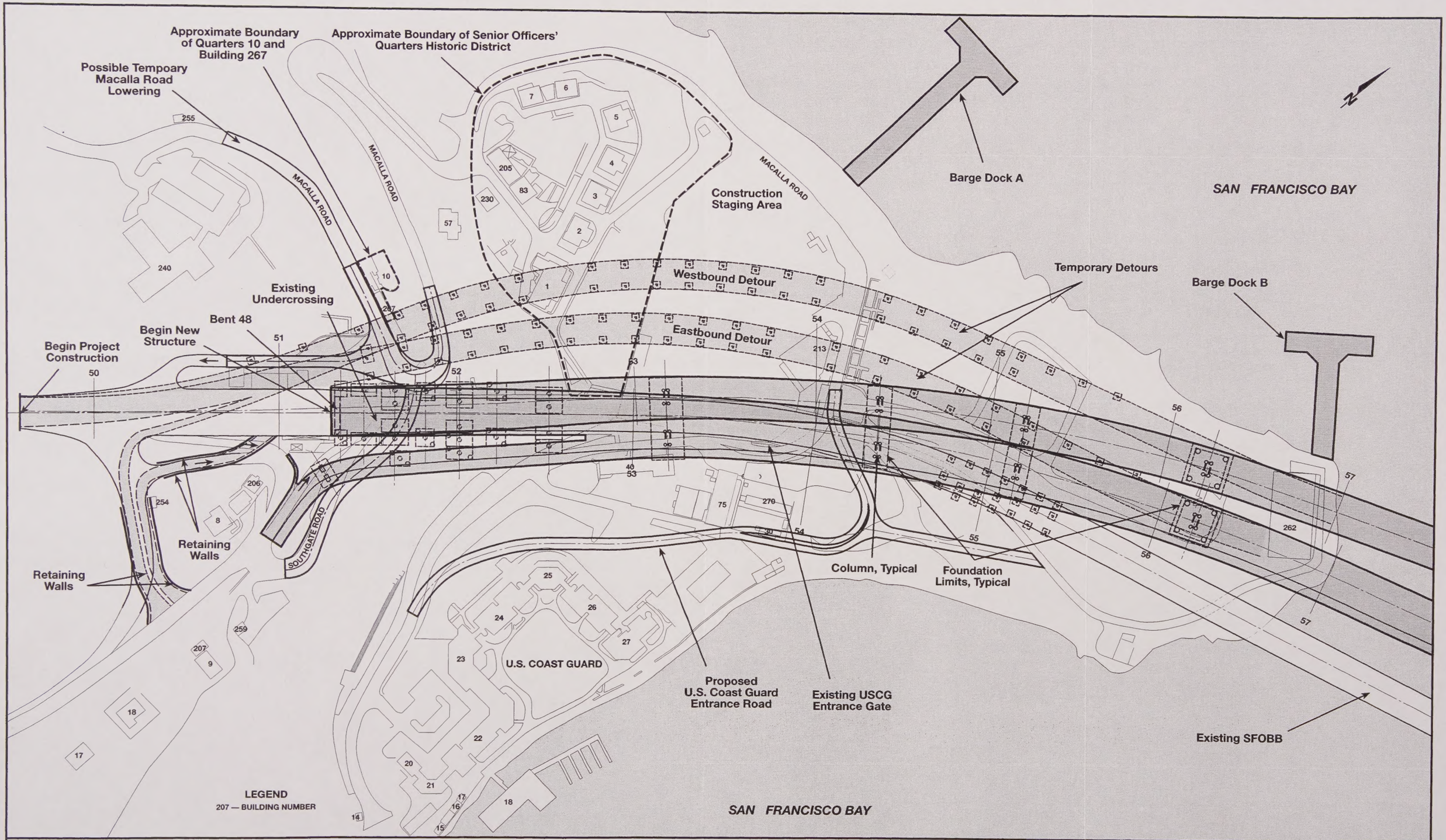


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NO SCALE
VERTICAL EXAGGERATED

Major Components of Dismantling Activities

Figure 2-15



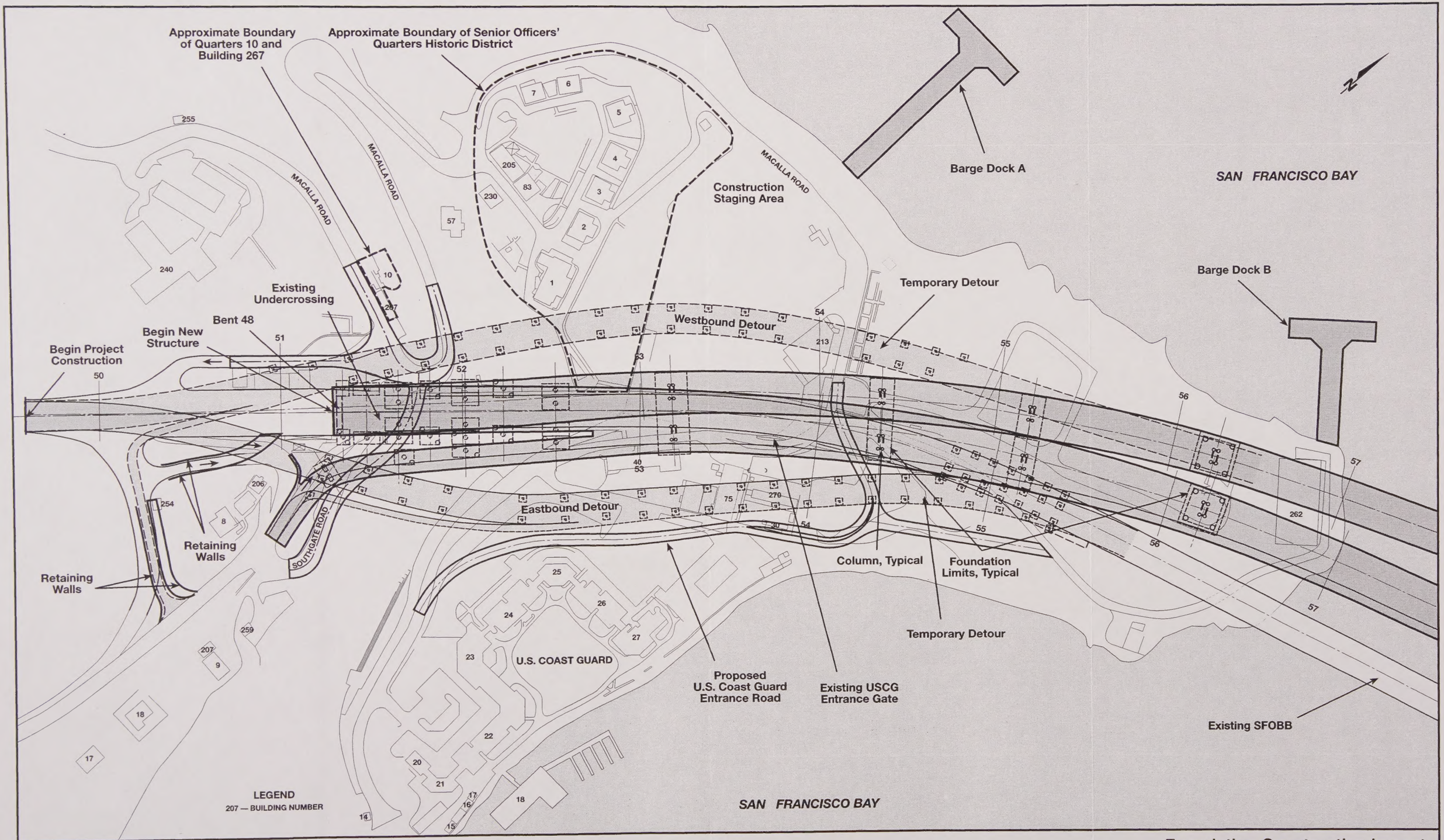
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,000
0 25 50 100 m

Foundation Construction Impact
Temporary Detours: North Option Replacement Alternative N-2

Figure 2-16.1

4/4/01



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Foundation Construction Impact
Temporary Detours: North-South Option Replacement Alternative N-2

Figure 2-16.2

4/4/01

Approximate Boundary of Quarters 10 and Building 267

Approximate Boundary of Senior Officers' Quarters Historic District

Possible Tempoary Macalla Road Lowering

MACALLA ROAD

Construction Staging Area

Barge Dock A

SAN FRANCISCO BAY

Temporary Detours

Barge Dock B

Westbound Detour

Eastbound Detour

Existing Undercrossing

Bent 48

Begin New Structure

Begin Project Construction

Retaining Walls

SOUTHGATE ROAD

Column, Typical

Foundation Limits, Typical

U.S. COAST GUARD

Proposed U.S. Coast Guard Entrance Road

Existing USCG Entrance Gate

Existing SFOBB

LEGEND

207 — BUILDING NUMBER

SAN FRANCISCO BAY

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:2,000

0 25 50 100 m

Foundation Construction Impact

Temporary Detours: North Option Replacement Alternative N-6

Figure 2-17.1

4/4/01

Approximate Boundary of Quarters 10 and Building 267

Approximate Boundary of Senior Officers' Quarters Historic District

MACALLA ROAD

Construction Staging Area

Barge Dock A

SAN FRANCISCO BAY

Barge Dock B

Temporary Detour

Existing Undercrossing

Bent 48

Begin New Structure

Begin Project Construction

Westbound Detour

Eastbound Detour

SOUTHGATE ROAD

Retaining Walls

Retaining Walls

Column, Typical

Foundation Limits, Typical

Temporary Detour

U.S. COAST GUARD

Proposed U.S. Coast Guard Entrance Road

Existing USCG Entrance Gate

Existing SFOBB

LEGEND

207 — BUILDING NUMBER

SAN FRANCISCO BAY

GRAPHIC SCALE 1:2,000

0 25 50 100 m

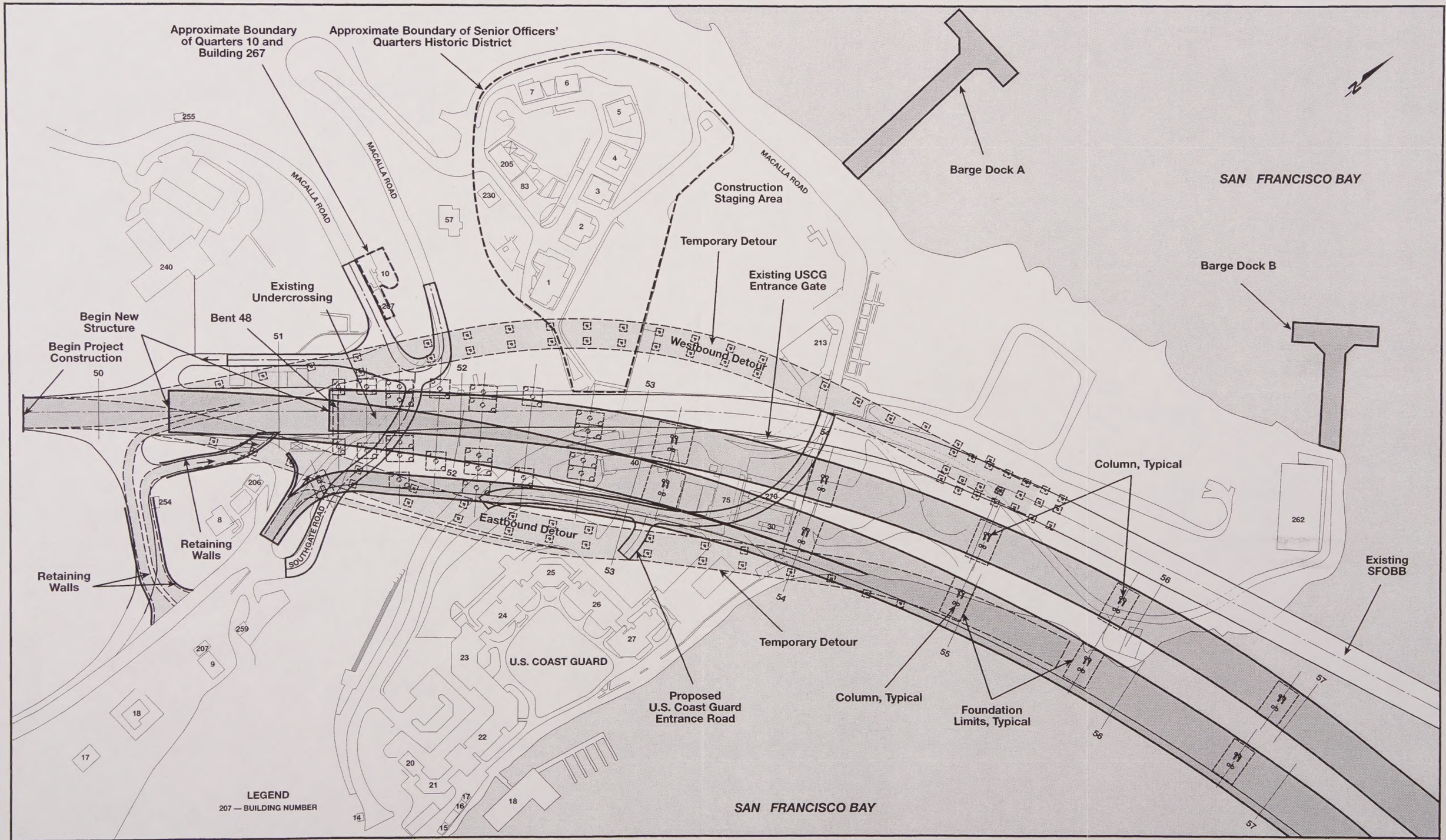
SFOBB EAST SPAN SEISMIC SAFETY PROJECT

Foundation Construction Impact

Temporary Detours: North-South Option Replacement Alternative N-6

Figure 2-17.2

4/4/01



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

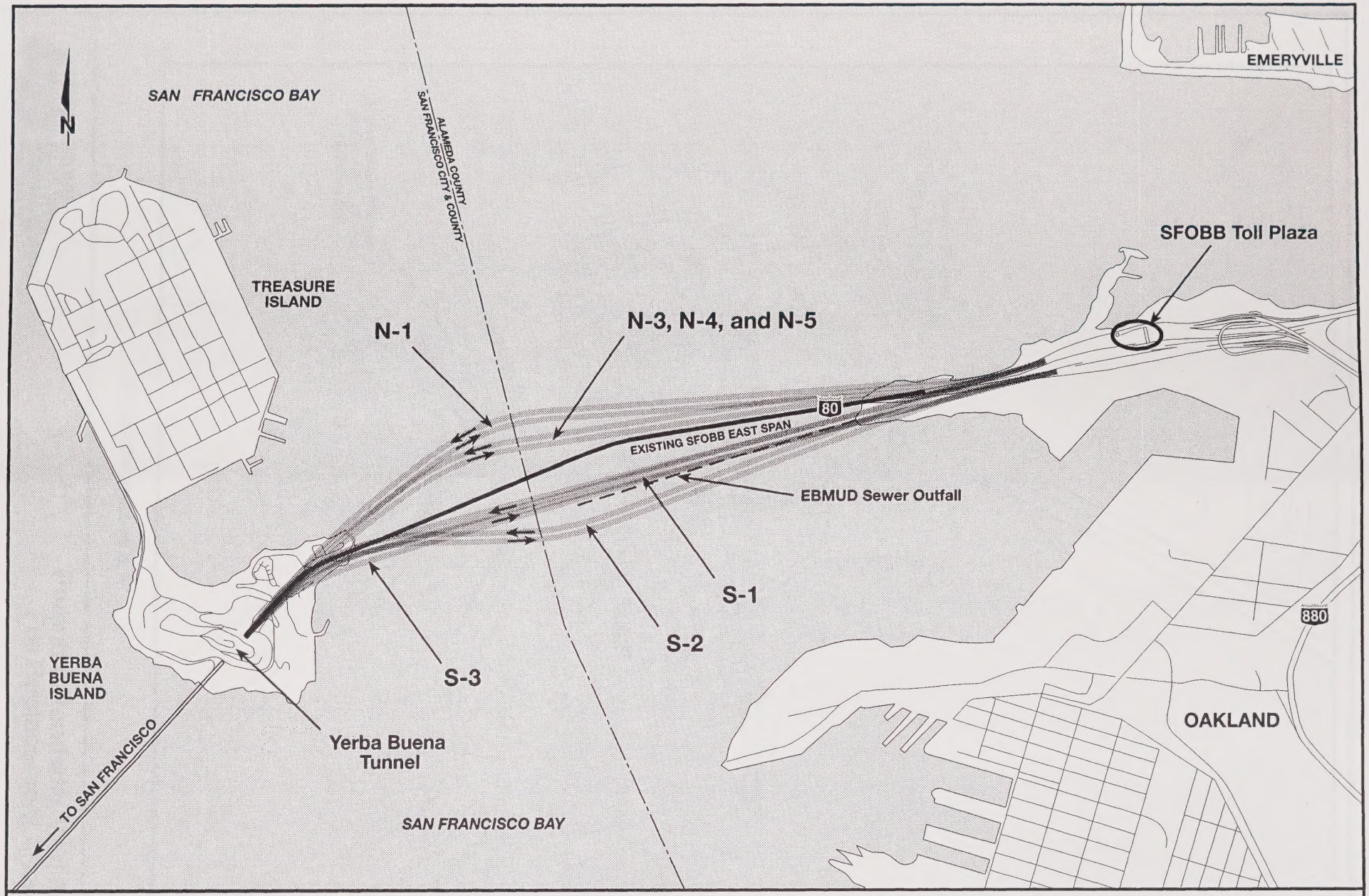
GRAPHIC SCALE 1:2,000

0 25 50 100 m

Foundation Construction Impact
Temporary Detours: North-South Option Replacement Alternative S-4

Figure 2-18

4/4/01



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

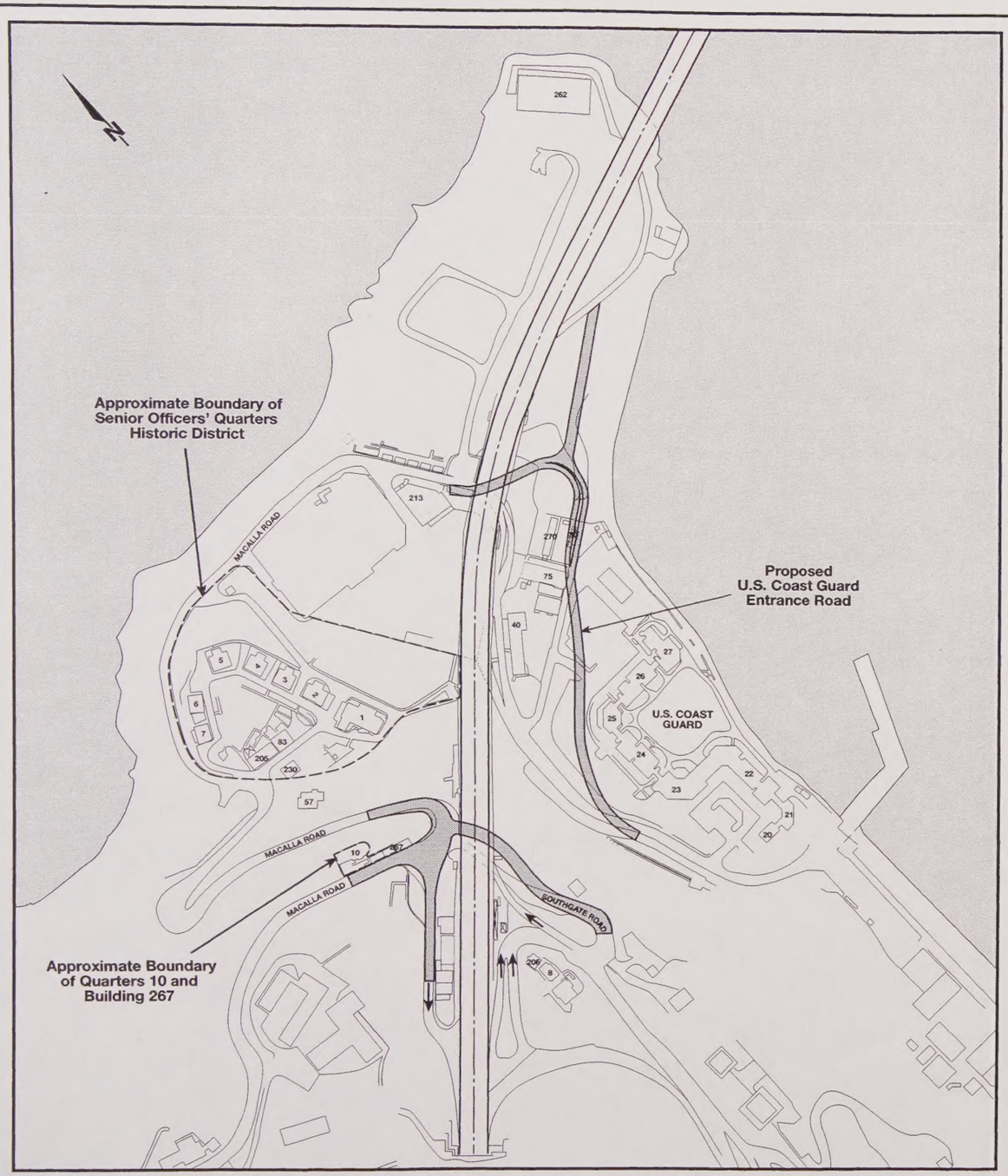
GRAPHIC SCALE 1:27,500

0 250 500 1000 m

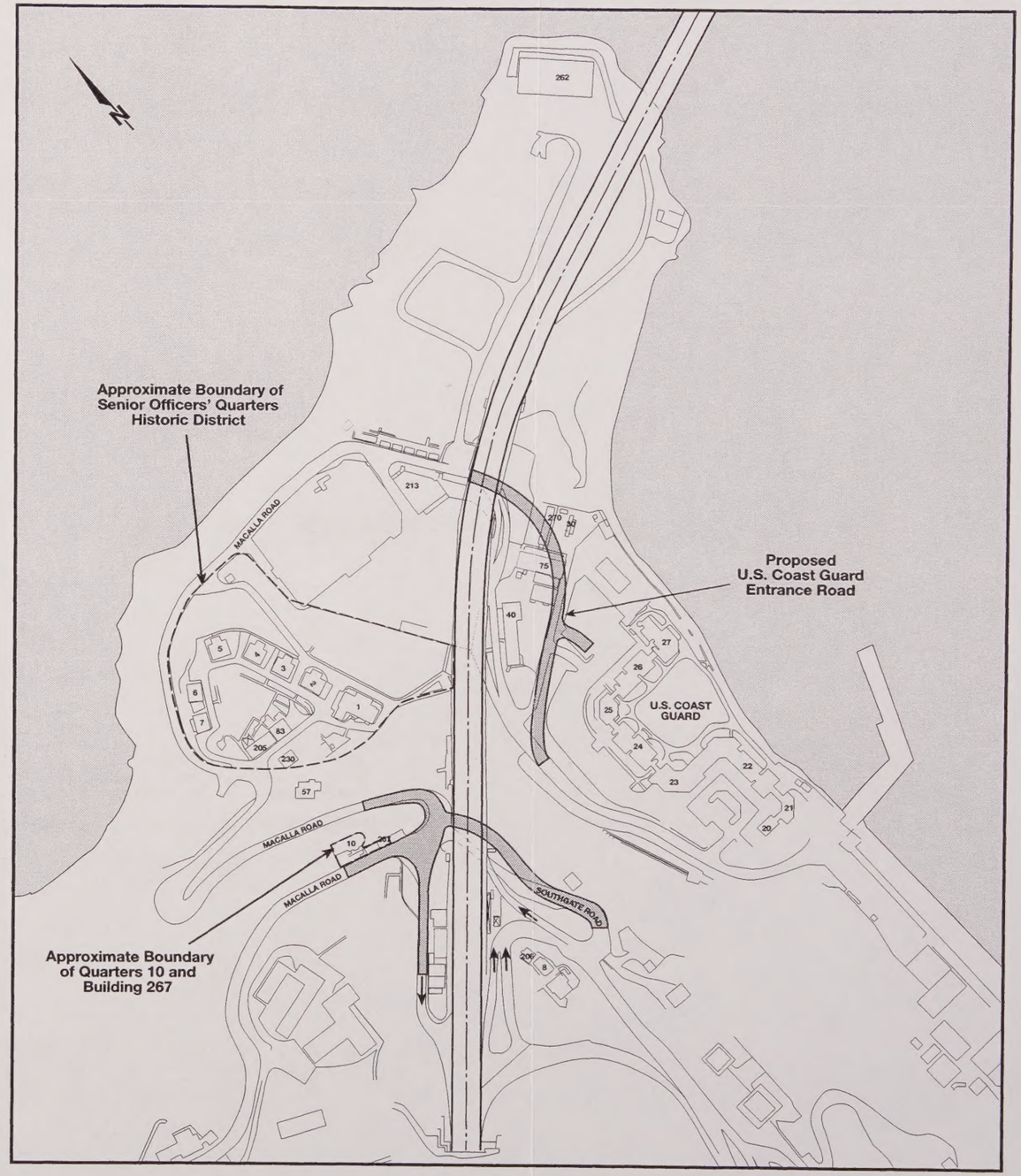
Replacement Alternatives Considered and Withdrawn

Figure 2-19

2/3/01



Replacement Alternatives N-2 and N-6



Replacement Alternative S-4

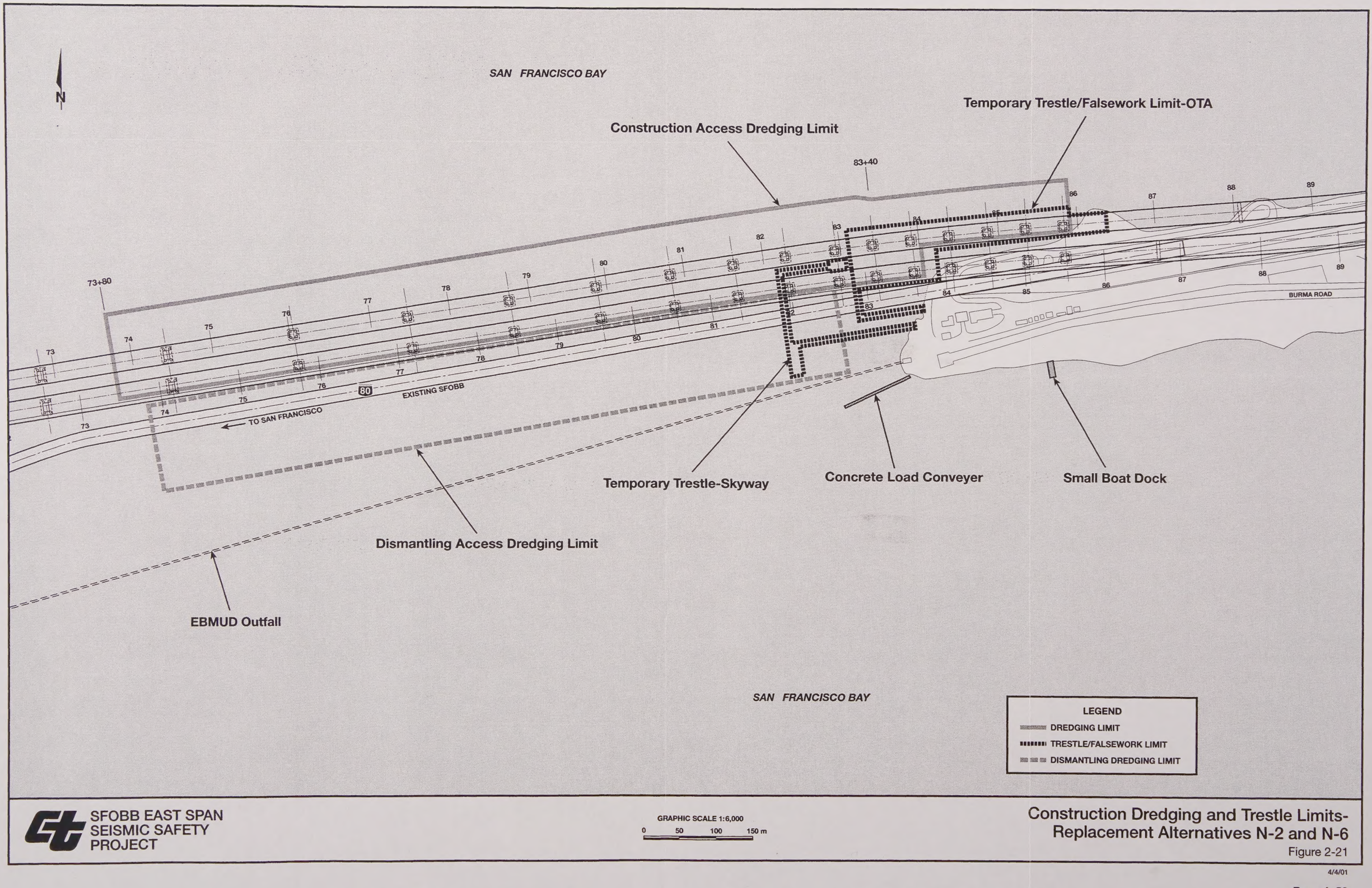
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:3,500
0 25 50 m

Potential Roadway Modifications For Replacement Alternatives

Figure 2-20

4/12/01

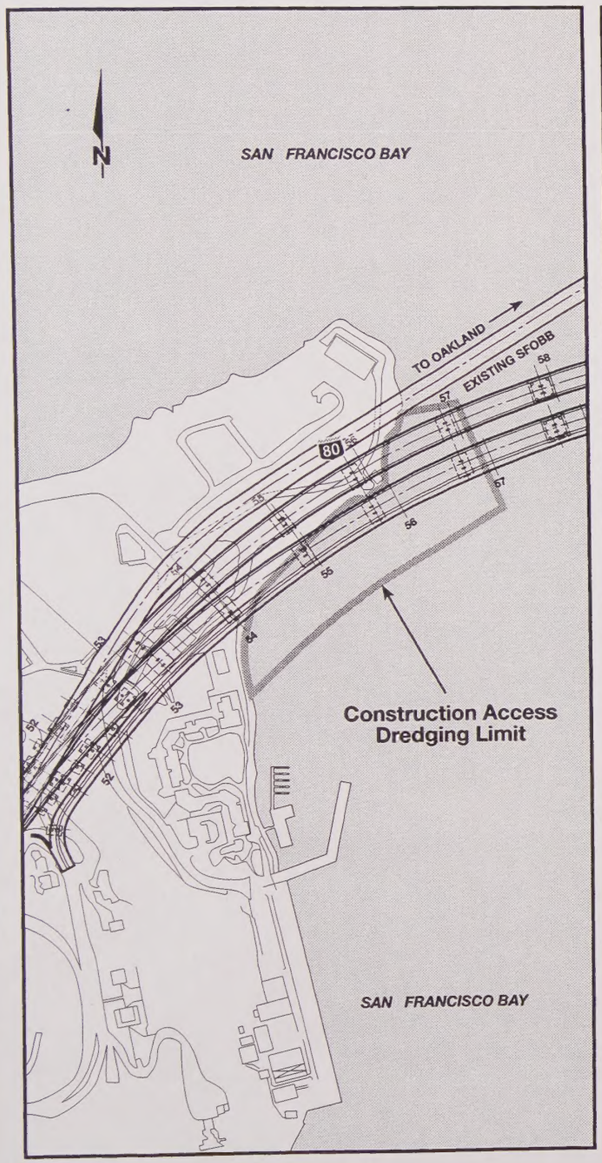


SFOBB EAST SPAN SEISMIC SAFETY PROJECT

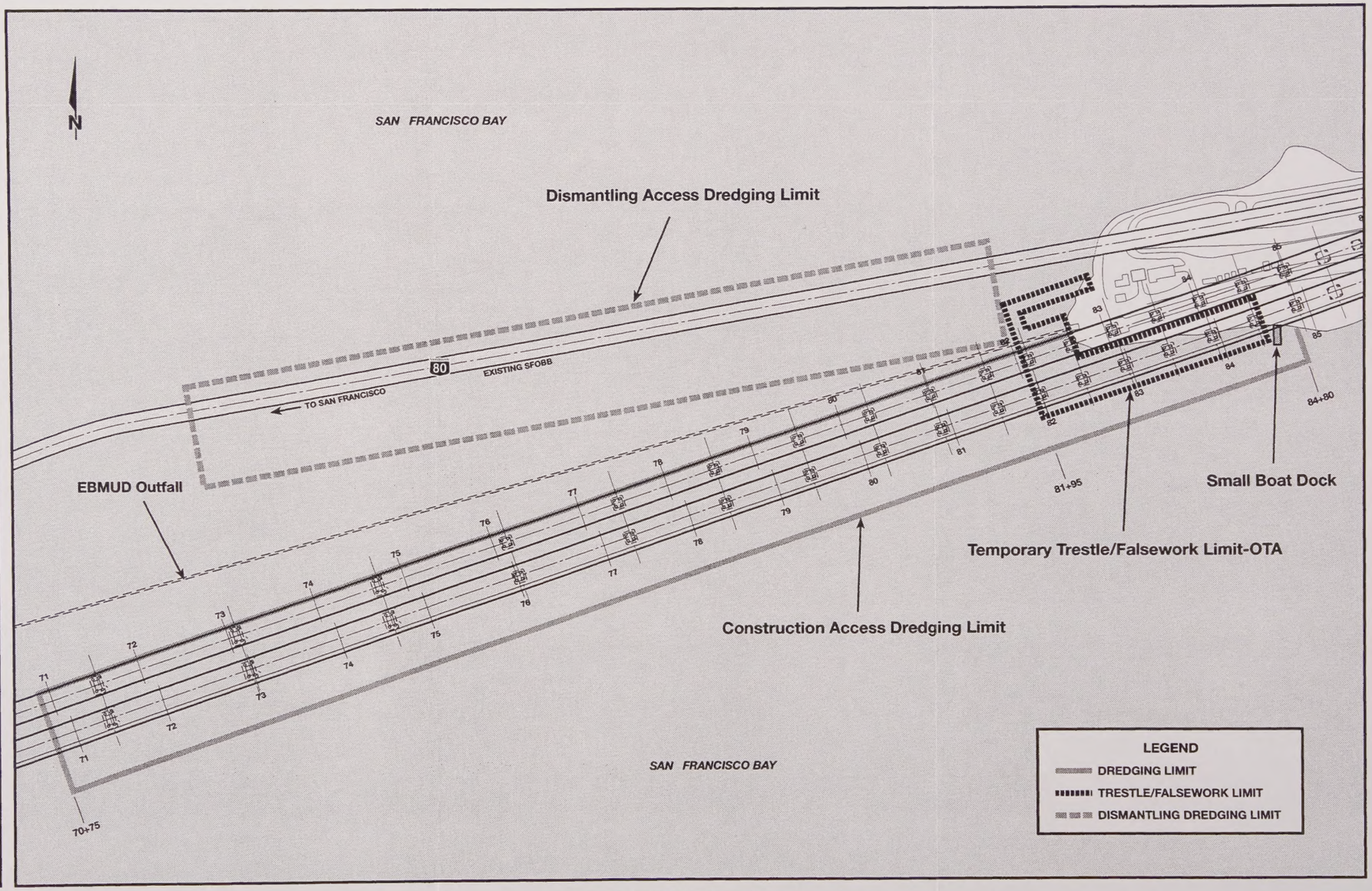
GRAPHIC SCALE 1:6,000
0 50 100 150 m

Construction Dredging and Trestle Limits-
Replacement Alternatives N-2 and N-6
Figure 2-21

4/4/01



Yerba Buena Island



Oakland Touchdown Area

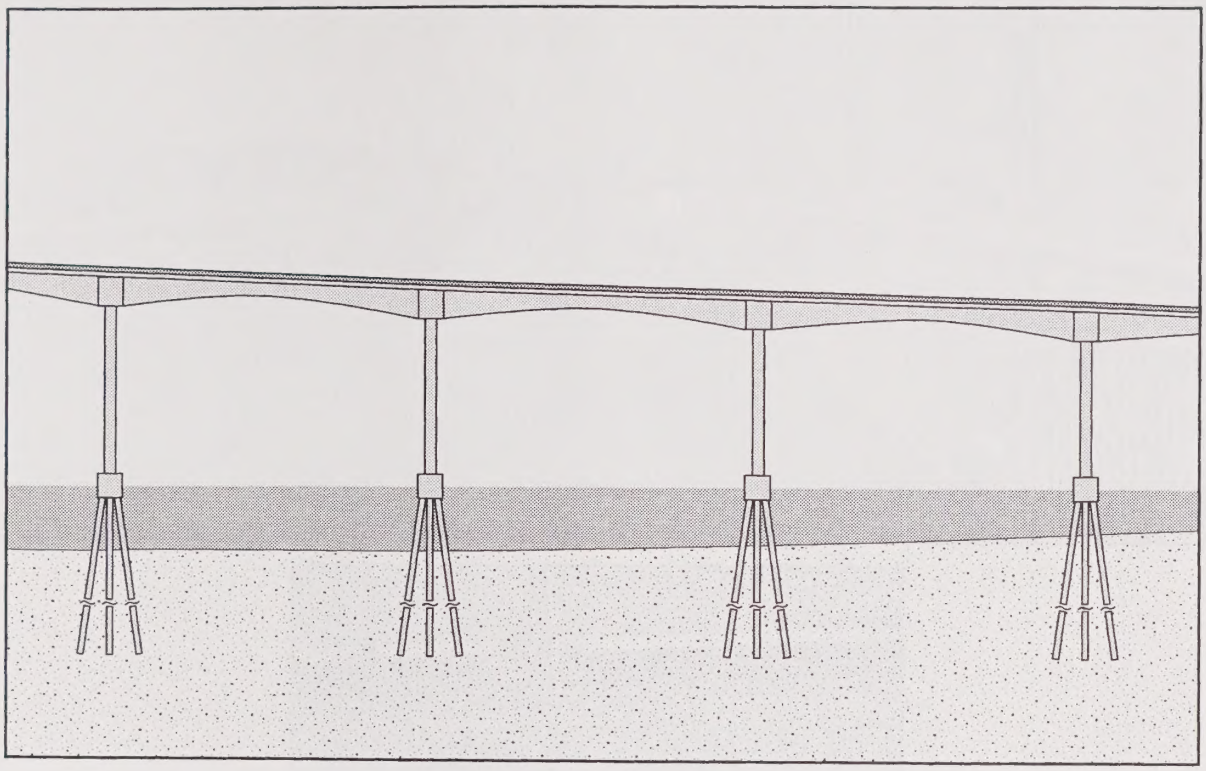
SFOBB EAST SPAN SEISMIC SAFETY PROJECT

GRAPHIC SCALE 1:7,000
0 50 10 150 m

Construction Dredging and Trestle Limits-Replacement Alternative S-4

Figure 2-22

4/4/



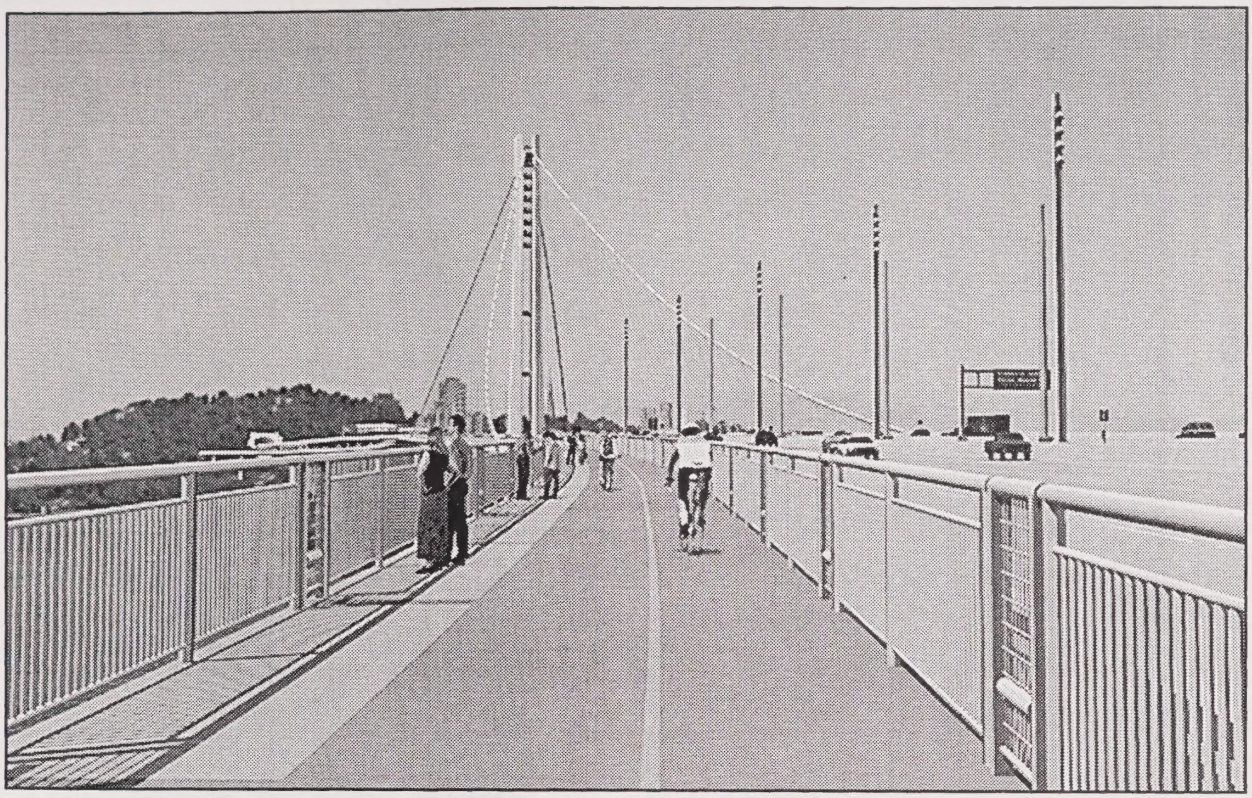
Not to Scale

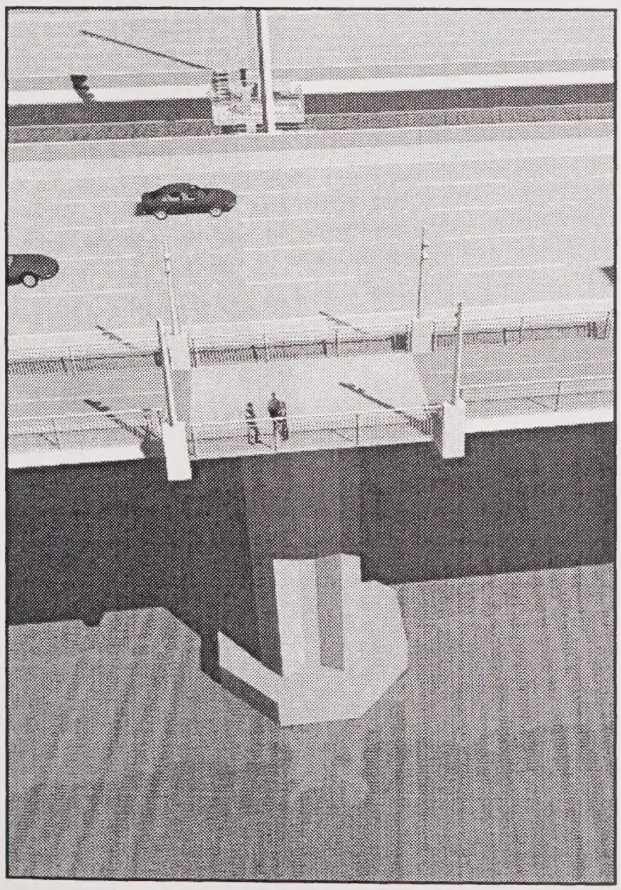
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Typical Frame for Haunched Concrete Girders on Skyway Structure

Figure 2-23

2/7/01



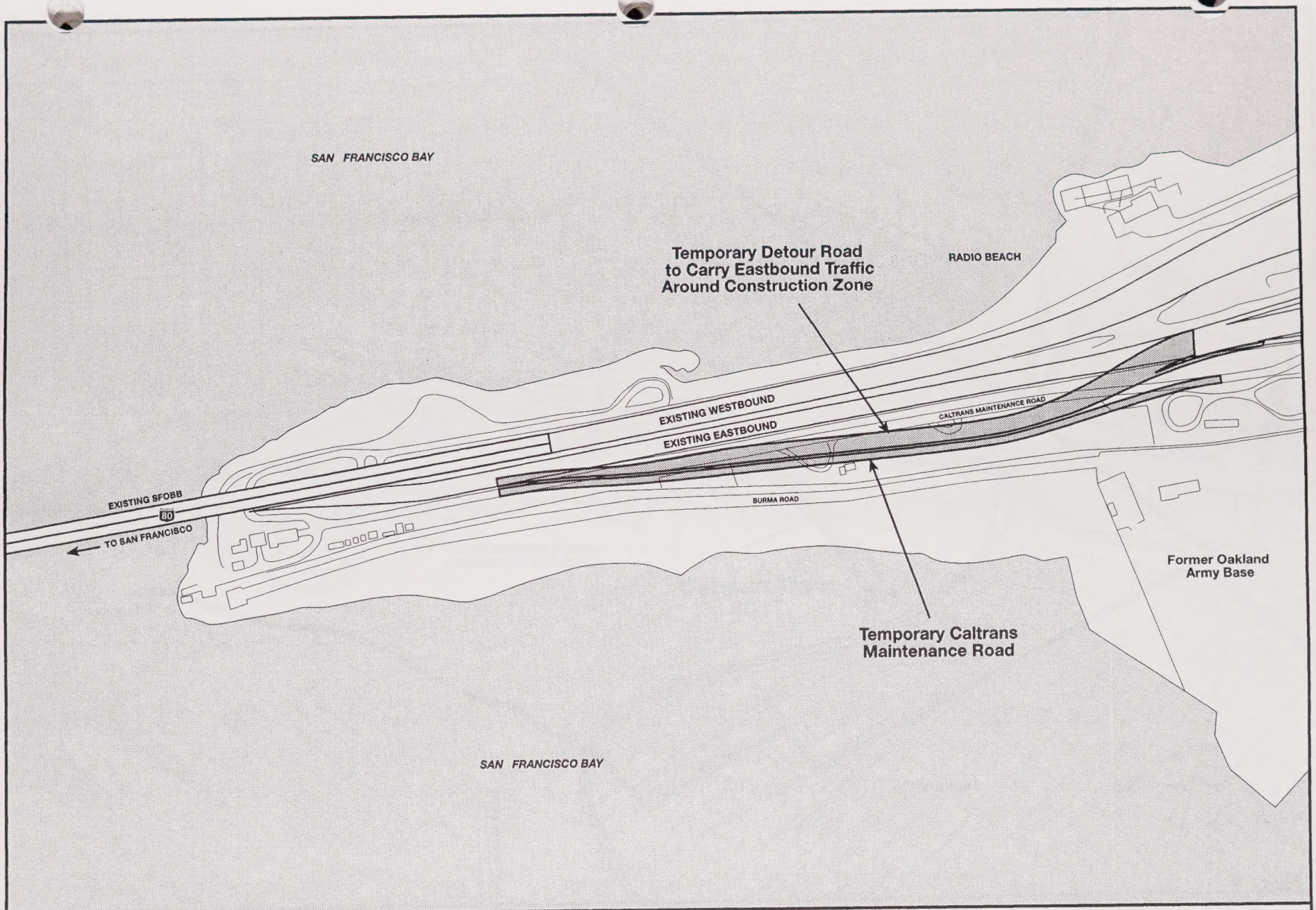


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Visual Simulations of Bicycle and Pedestrian Path and Belvederes

Figure 2-24

9/10/00



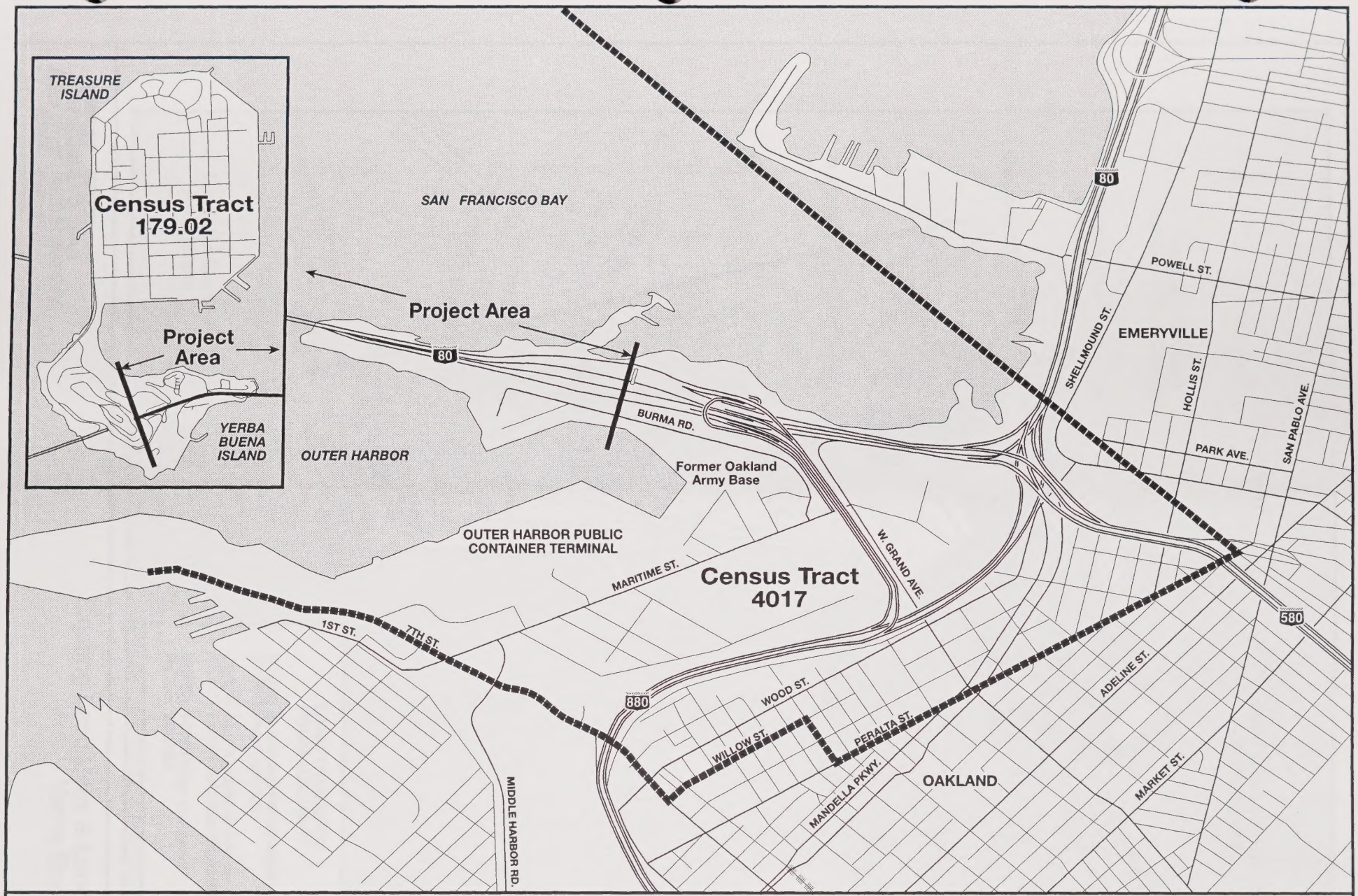
SFOBB EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:4,000

0 50 100 150 m

Temporary Roadways
Oakland Touchdown Area
Figure 2-25

2/7/01



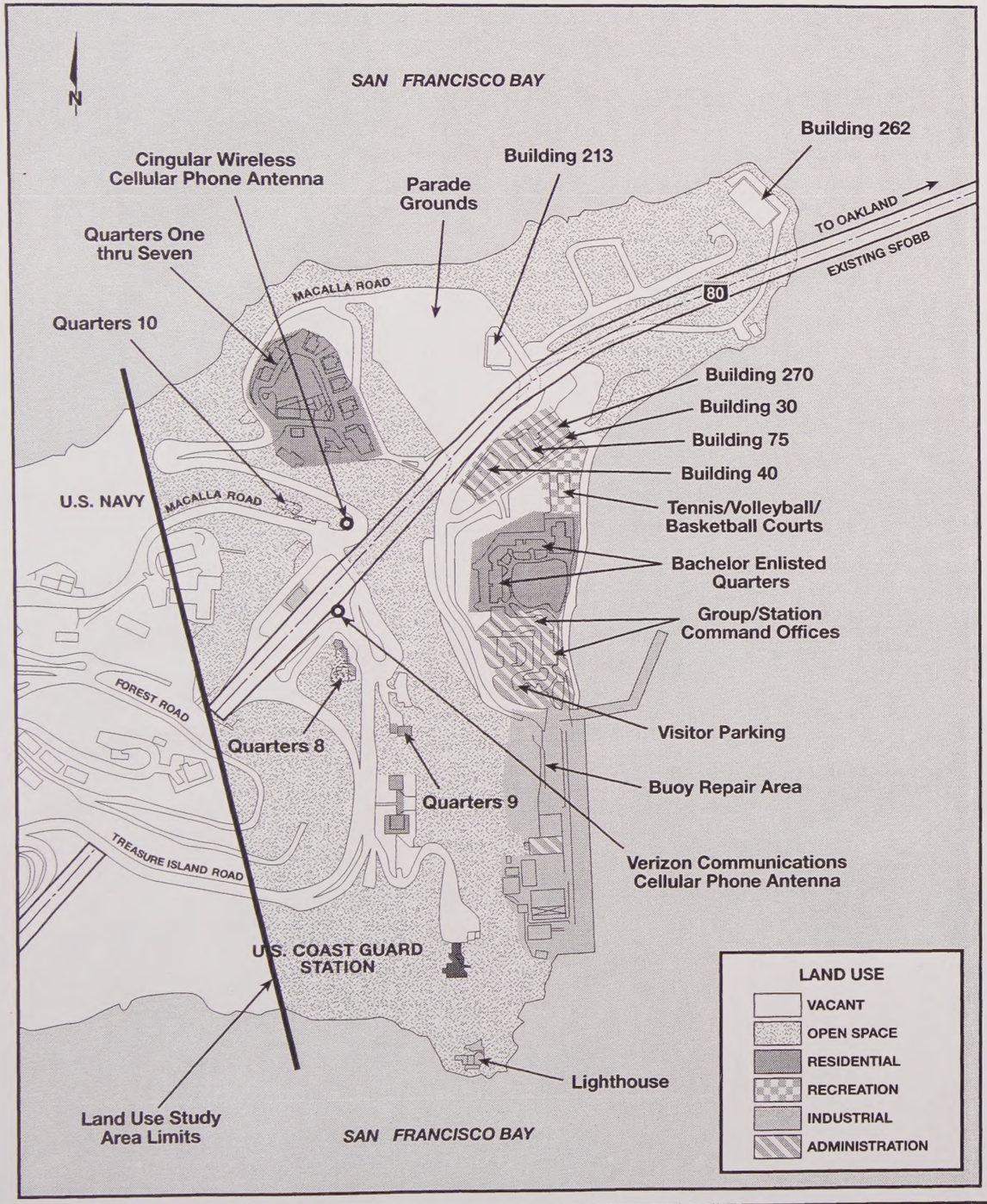
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

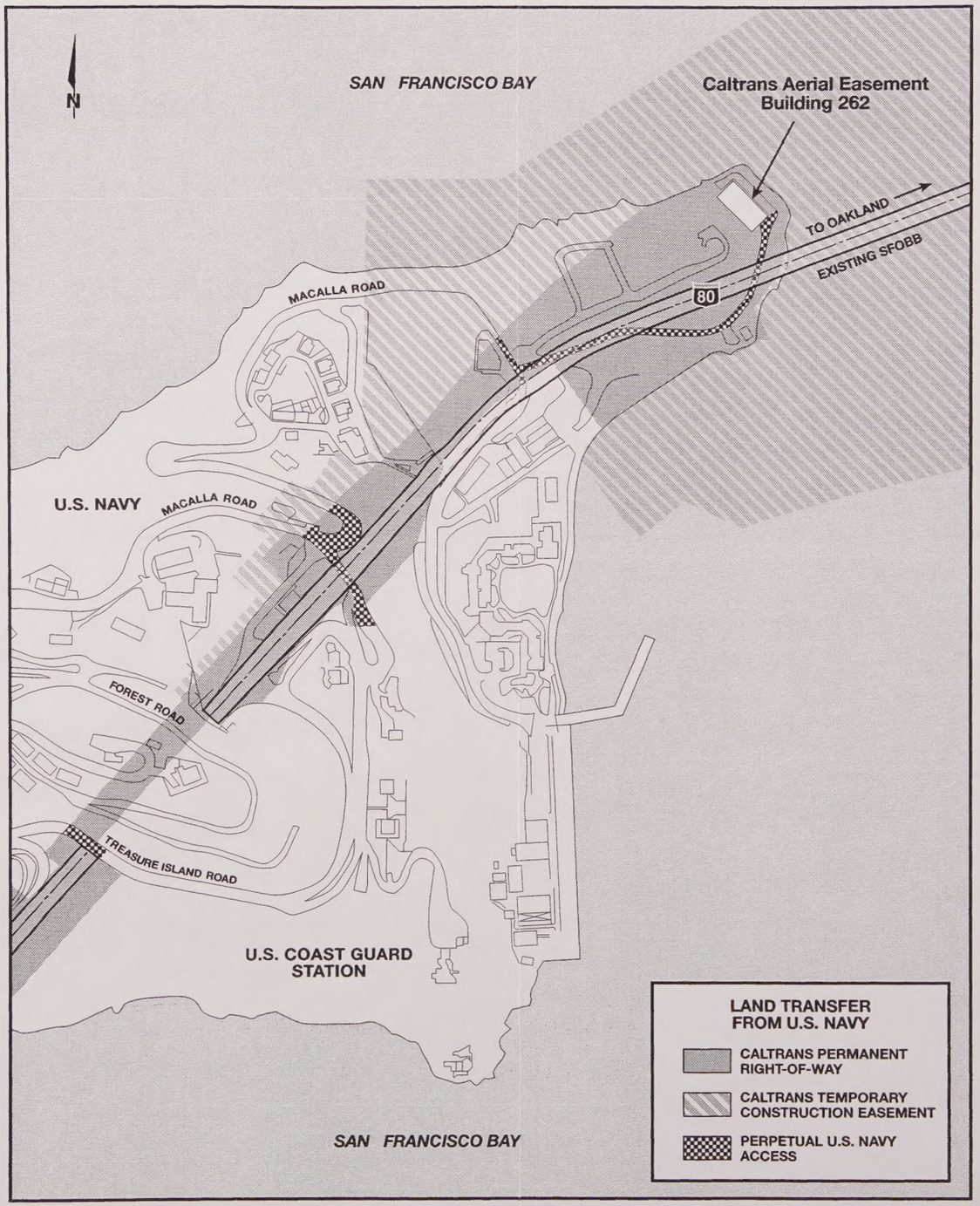
NO SCALE

Census Tracts

Figure 3-1

2/3/01





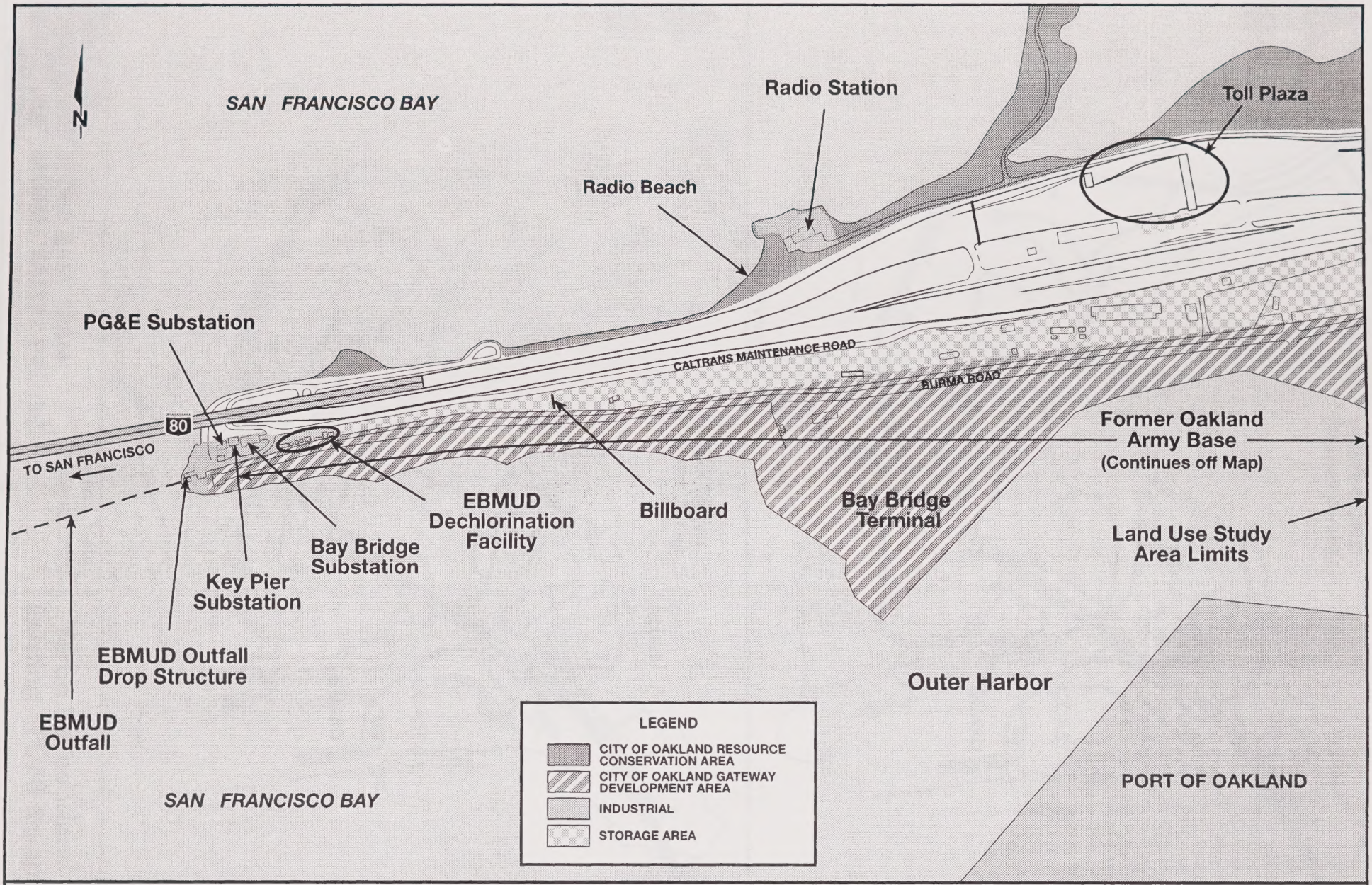
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:5,000
0 100 200 300 m

Existing Land Uses & Land Transfer
Yerba Buena Island

Figure 3-2

4/12/01



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

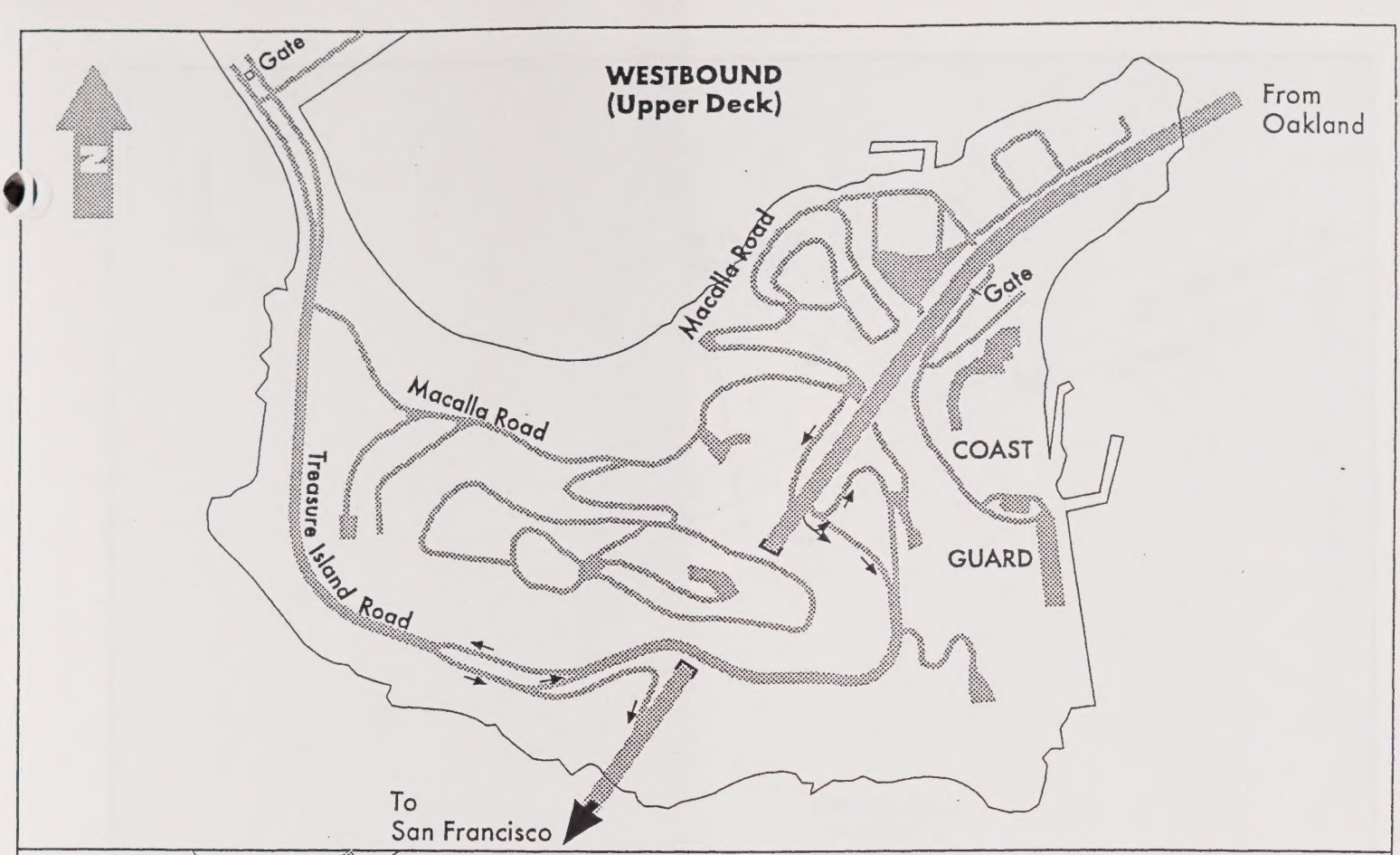
GRAPHIC SCALE 1:8,000

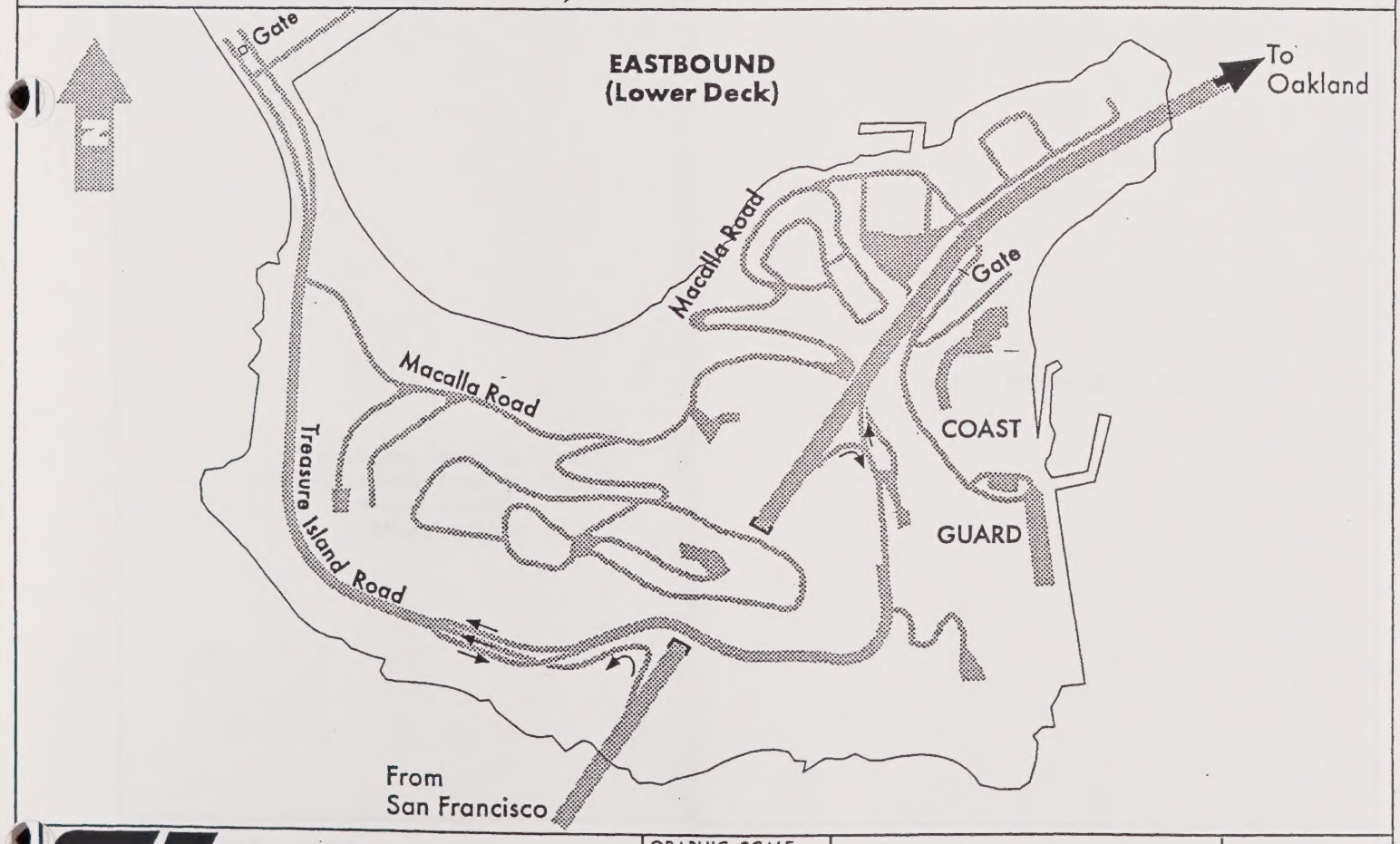
0 50 100 200 m

Existing Land Uses
Oakland Touchdown Area

Figure 3-3

4/5/01



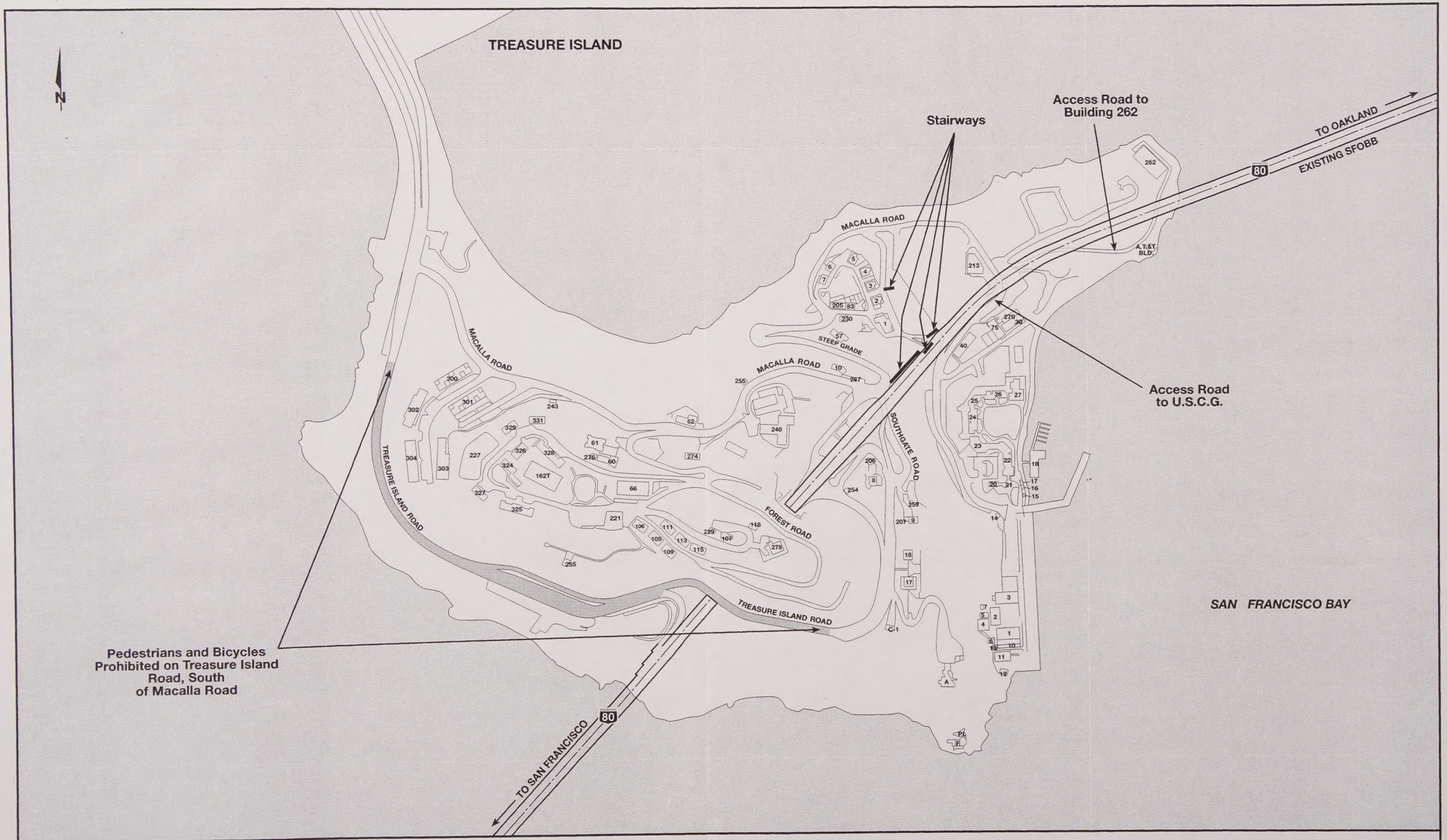


SFOBB EAST SPAN
SEISMIC SAFETY PROJECT

GRAPHIC SCALE
0 100m 200m

Yerba Buena Island
Existing SFOBB Ramps

FIGURE 3-4



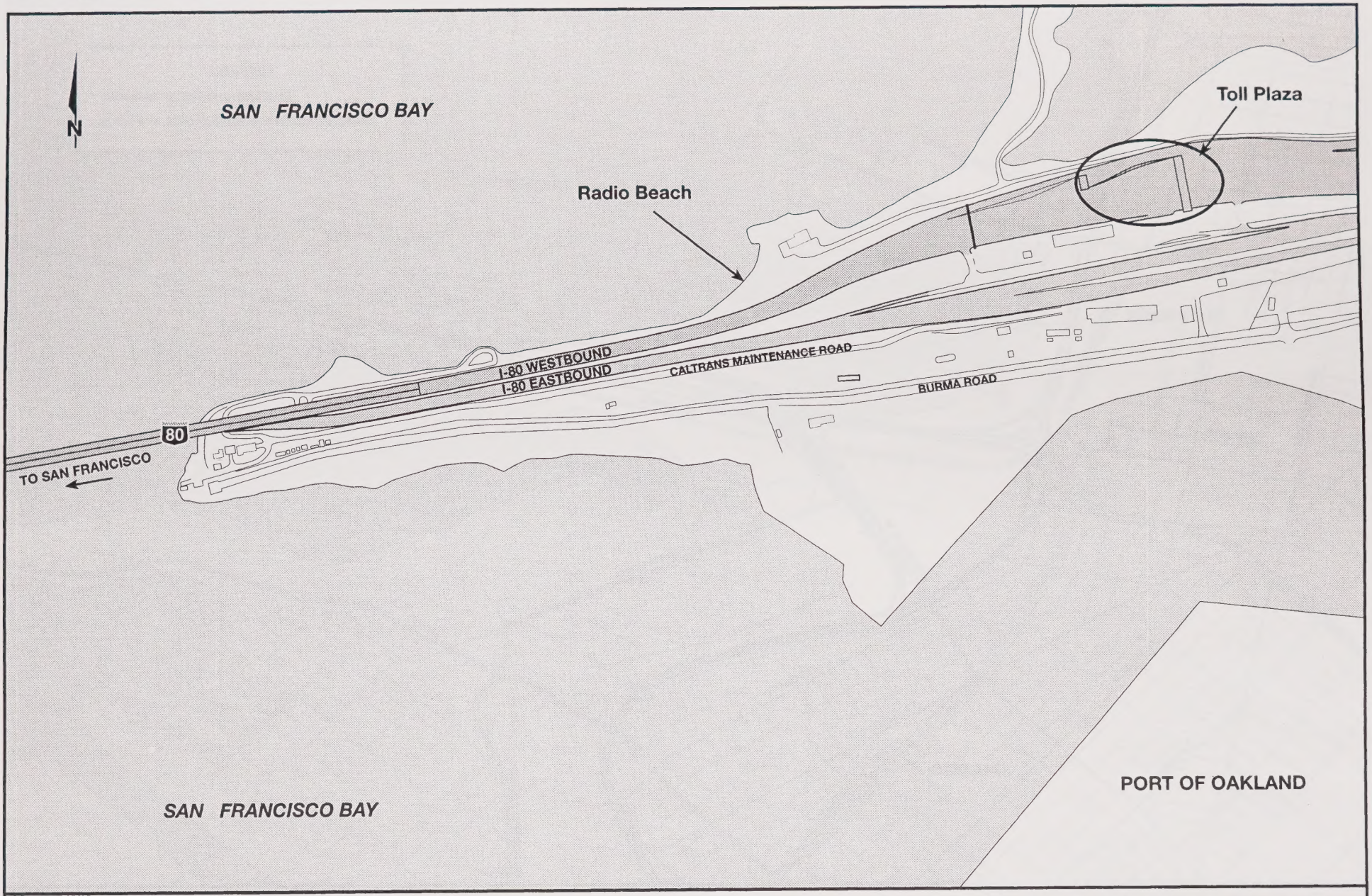
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:5,000
0 100 200 300 m

Streets and Pedestrian Facilities
Yerba Buena Island

Figure 3-5

2/3/01



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

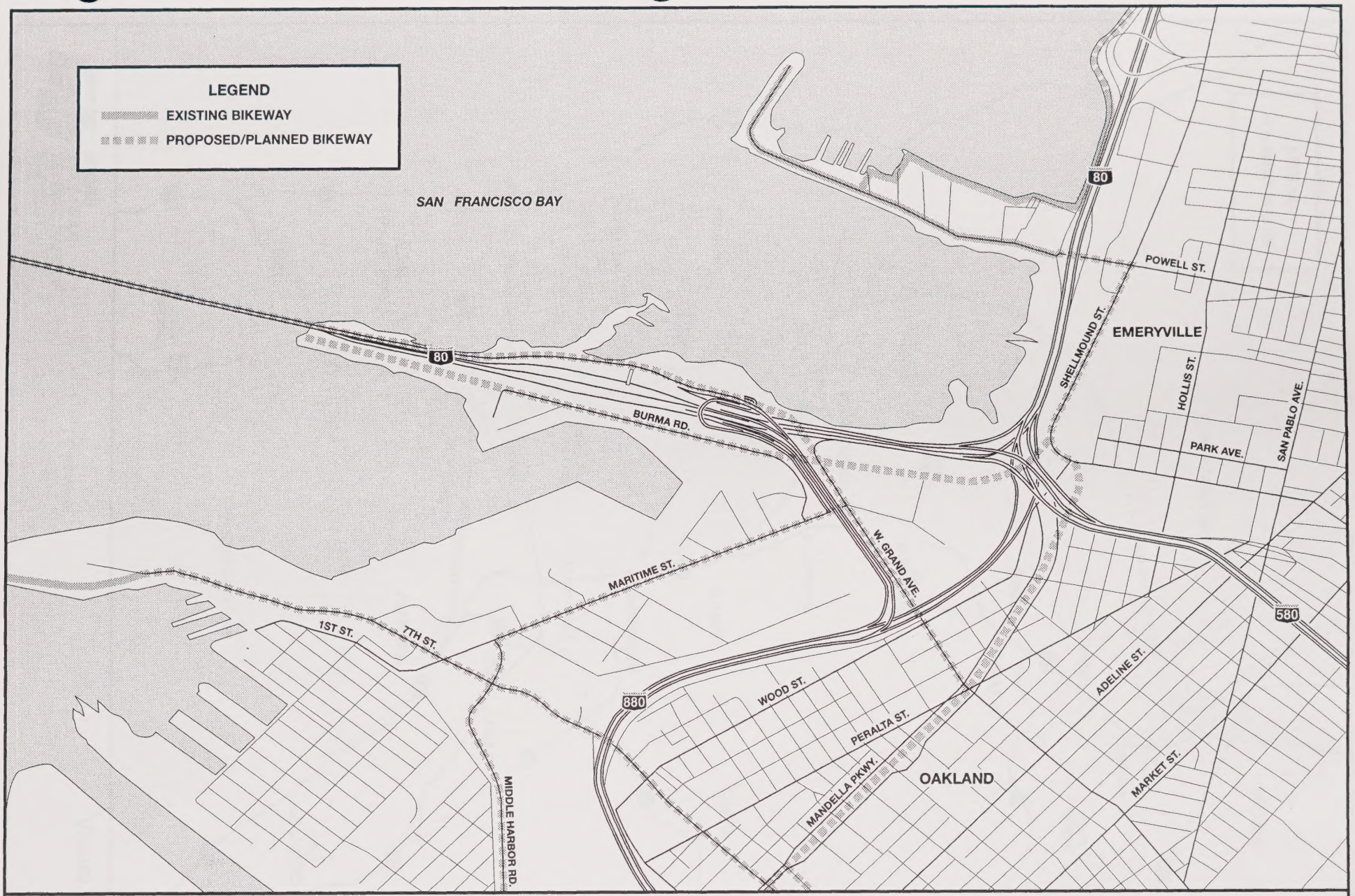
GRAPHIC SCALE 1:8,000

0 50 100 200 m

Existing Streets and Pedestrian Facilities
Oakland Touchdown Area

Figure 3-6

2/7/01



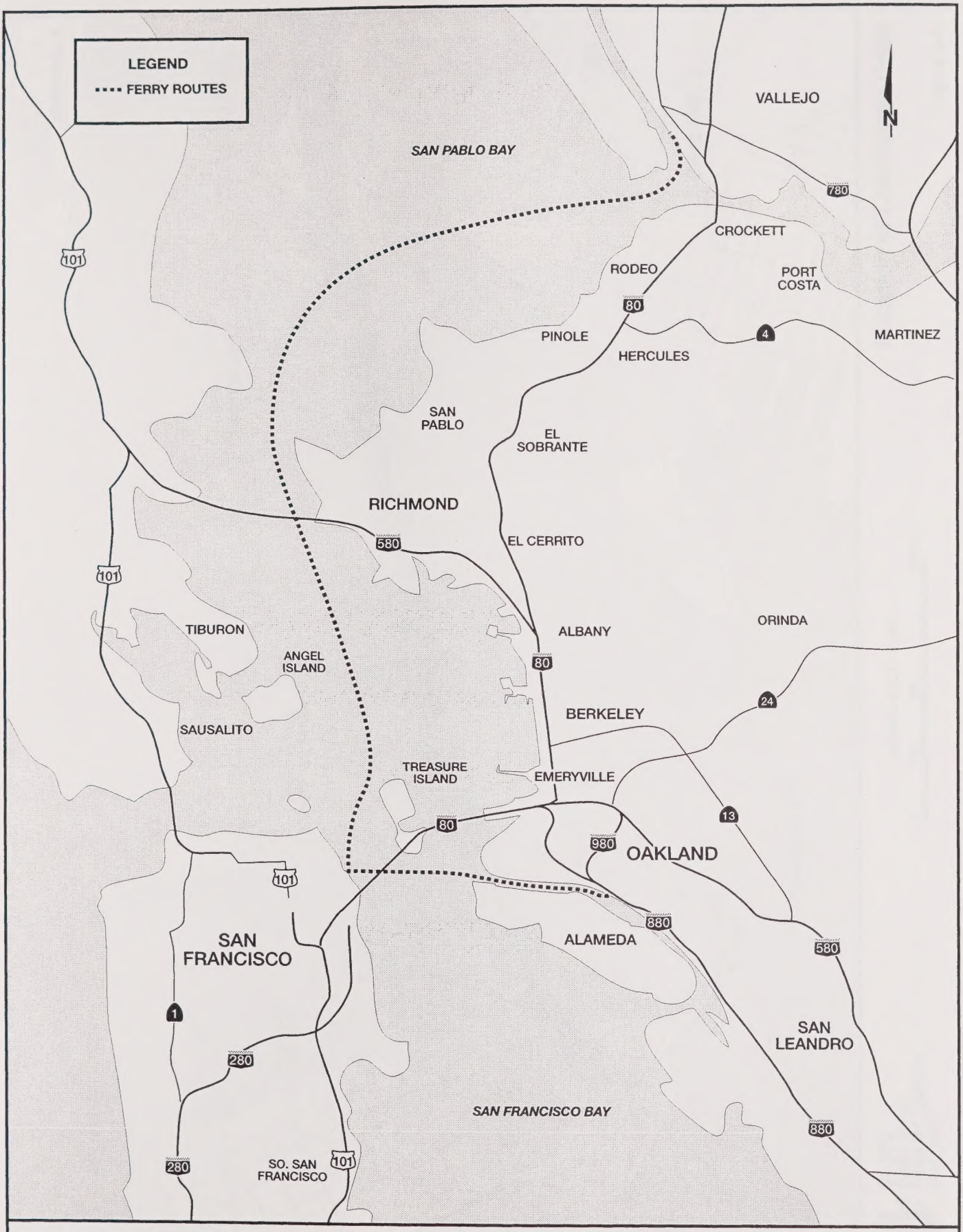
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NO SCALE

Bay Trails and Bikeways

Figure 3-7

12/13/00



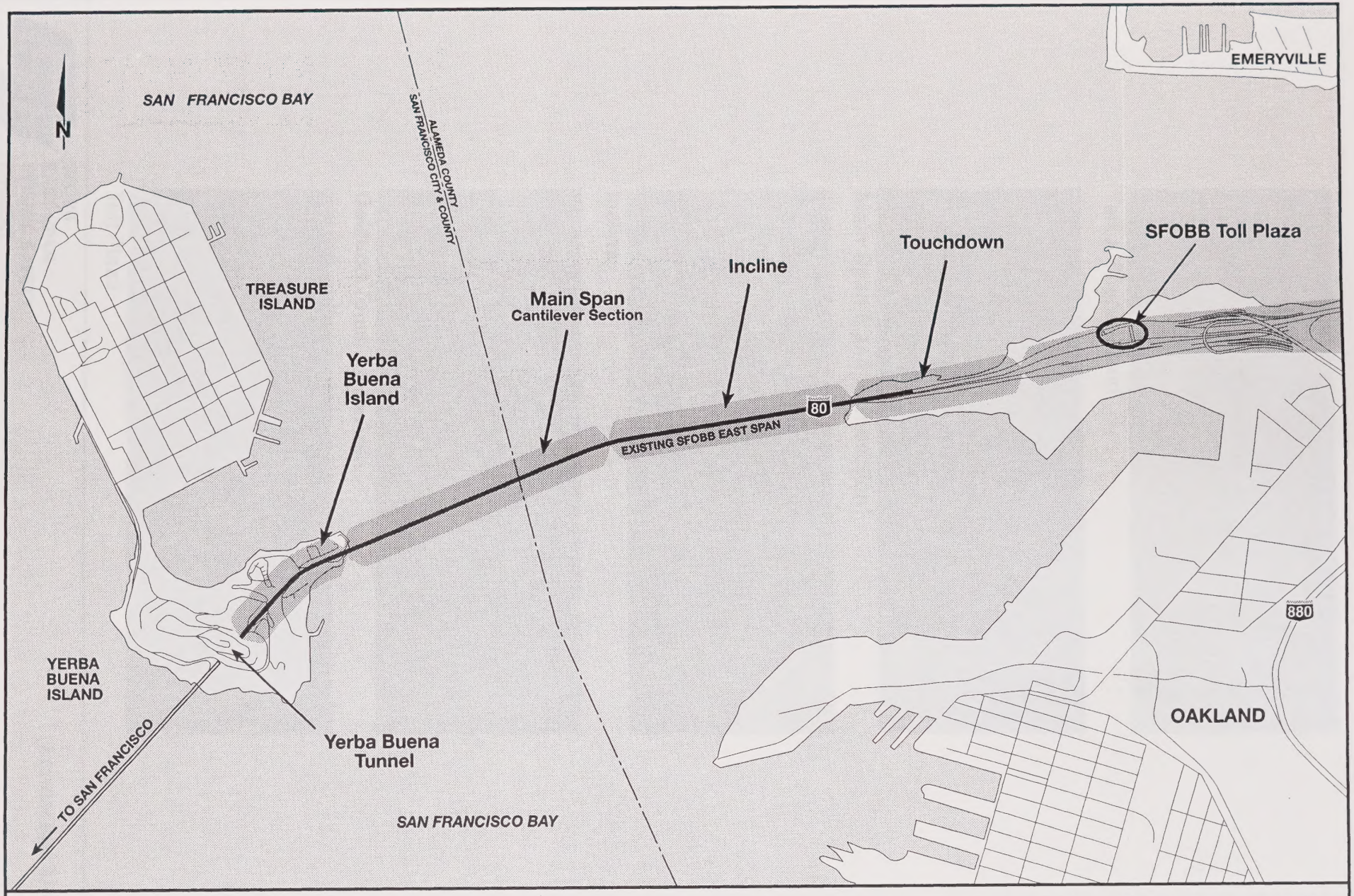
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NO SCALE

Visual Context

Figure 3-8

2/28/00



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

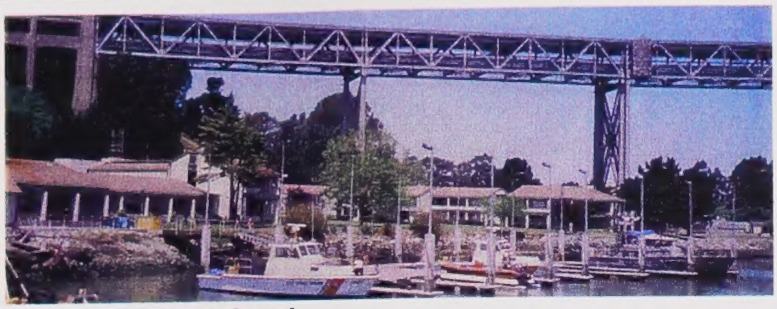
GRAPHIC SCALE 1:27,500

0 250 500 1000 m

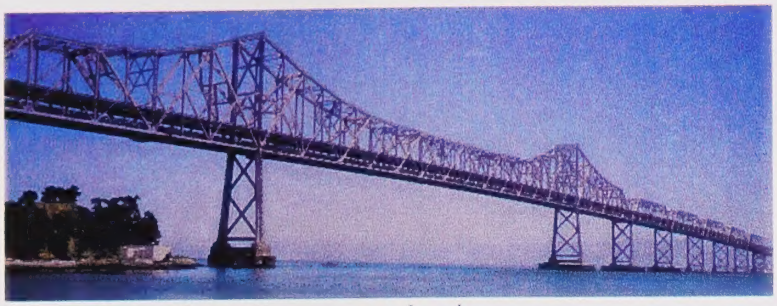
Location of Landscape Units

Figure 3-9

9/28/98



Yerba Buena Island



Main Span (cantilever section)

Incline

Oakland Touchdown Area

Toll Plaza

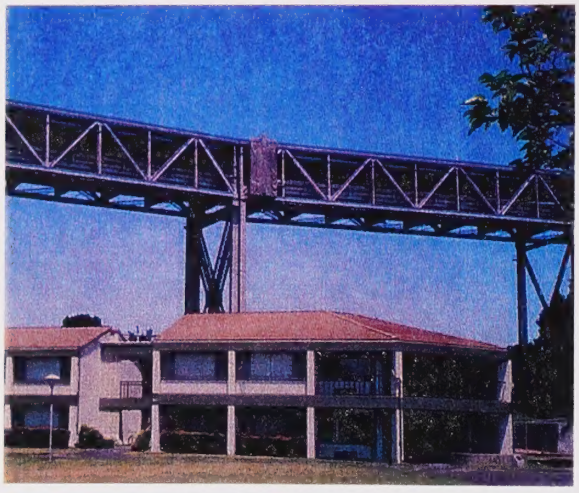
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Landscape Units

Figure 3.10.a

R1—Older Residential

01—Marsh/Estuary



R2—High Density Residential

02—Woodland

H1—Historic Structures

03—The Bay

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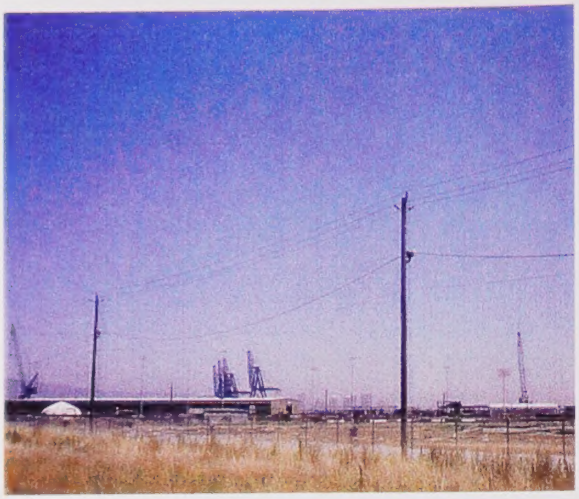
EAST SPAN
SEISMIC SAFETY
PROJECT

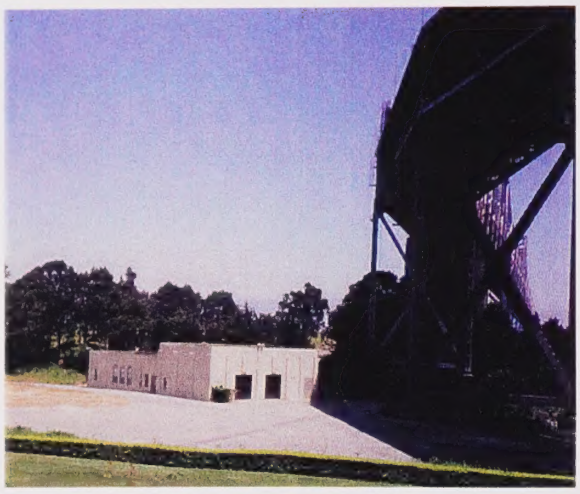
Image Types

Figure 3-10b



M1—US Army

I1—Light Industrial



M2—US Navy

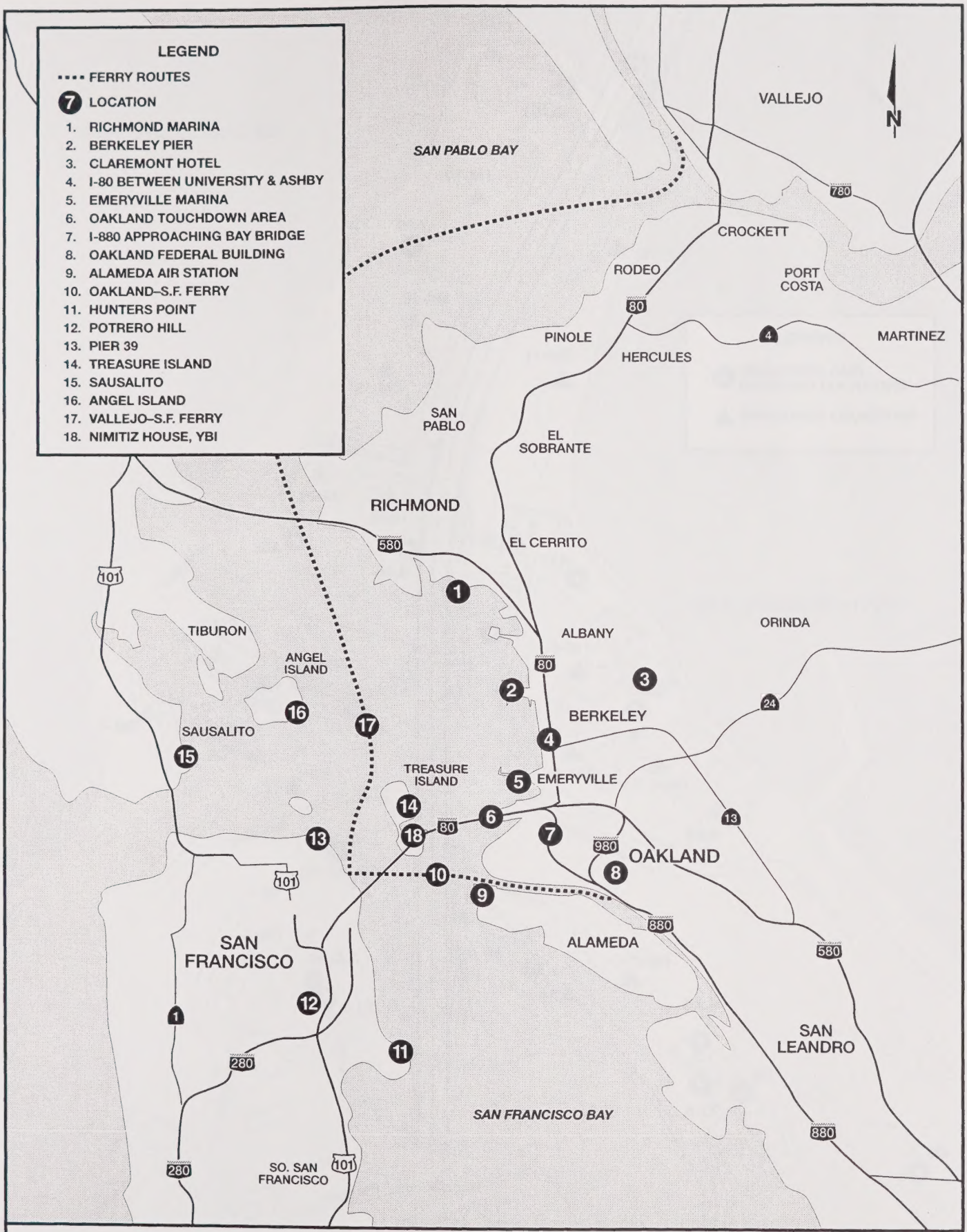
I2—Port Facilities

M3—Toll Plaza

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Image Types

Figure 3-10c



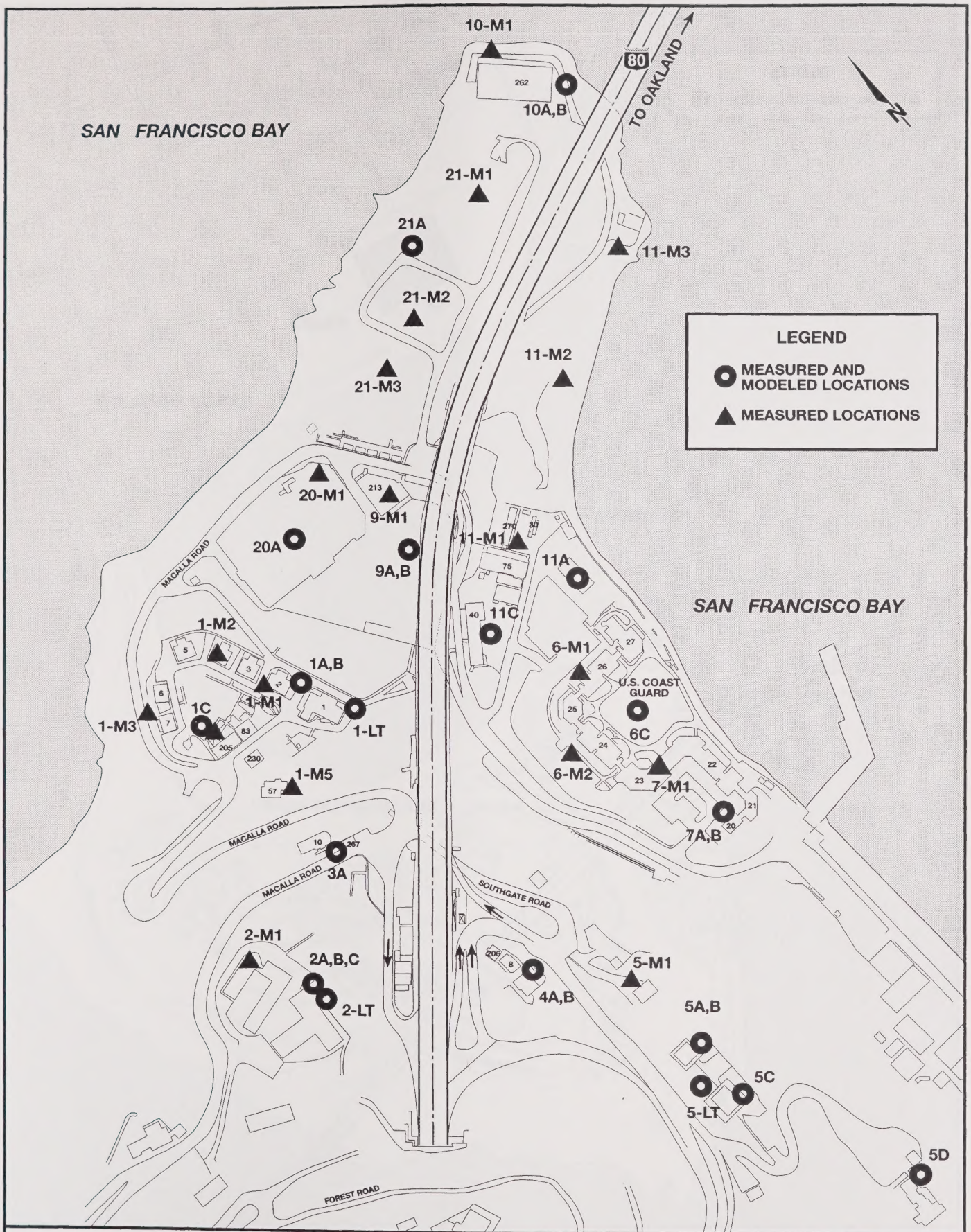
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NO SCALE

Visual Assessment Viewpoint Locations

Figure 3-11

2/28/00



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

GRAPHIC SCALE 1:3,500

0 25 50 m

Noise Measurement and Modeling Locations–Yerba Buena Island

Figure 3-12

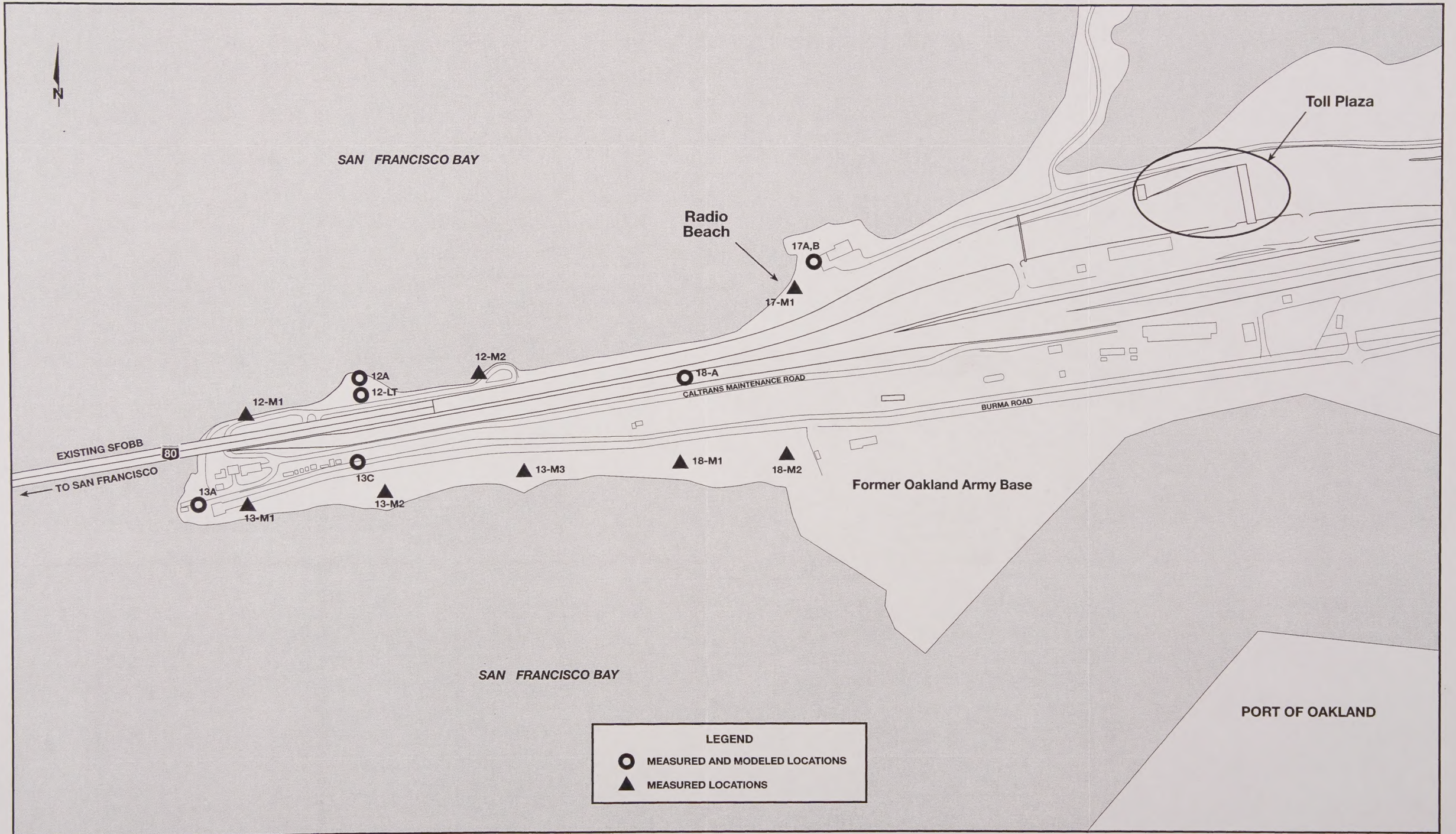
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:6,000

0 100 200 m

Noise Measurement and Modeling Locations – Treasure Island

Figure 3-13

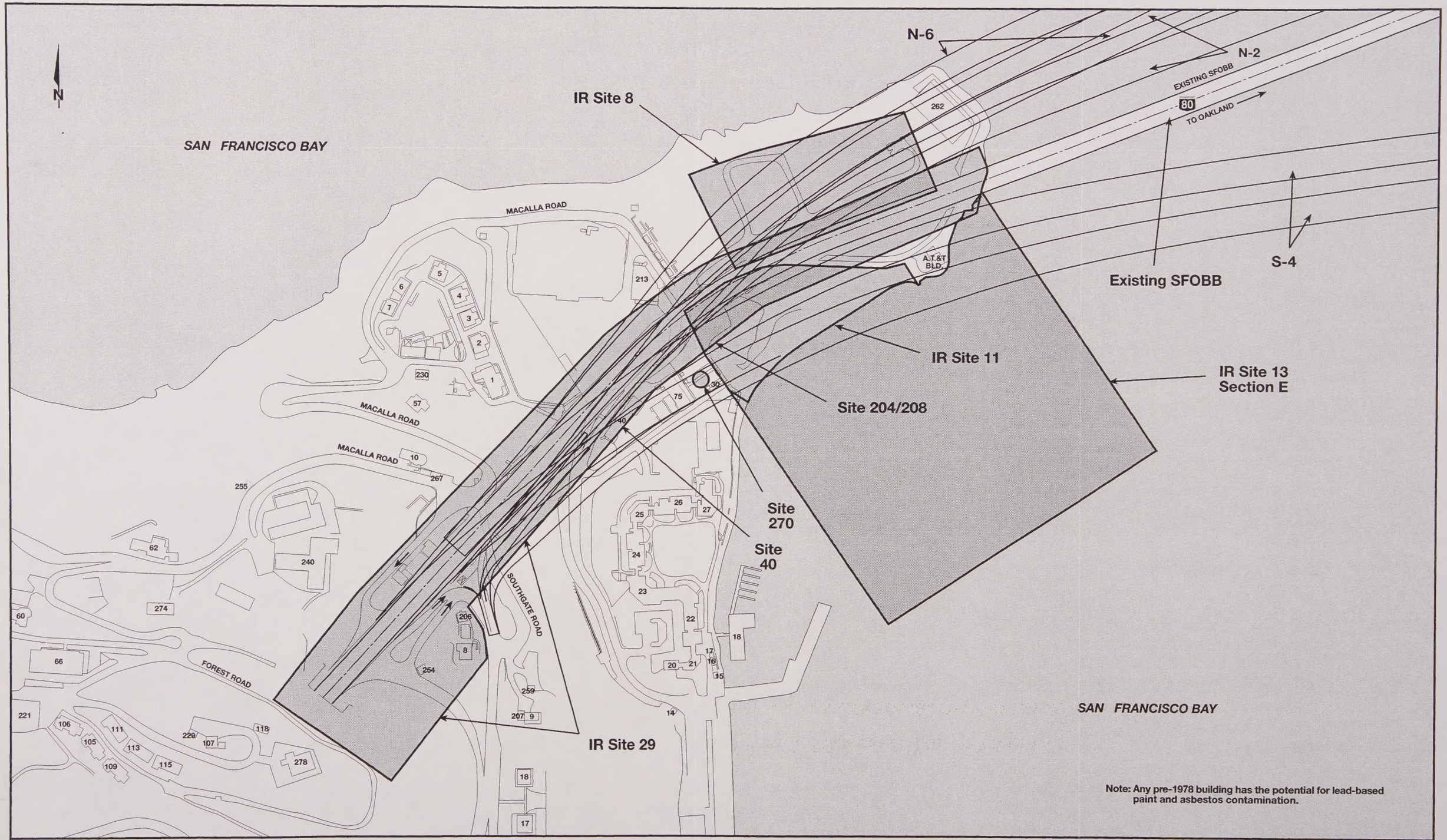


SFOBB EAST SPAN SEISMIC SAFETY PROJECT

Noise Measurement and Modeling Locations–Oakland Touchdown Area

Figure 3-14

2/3/01

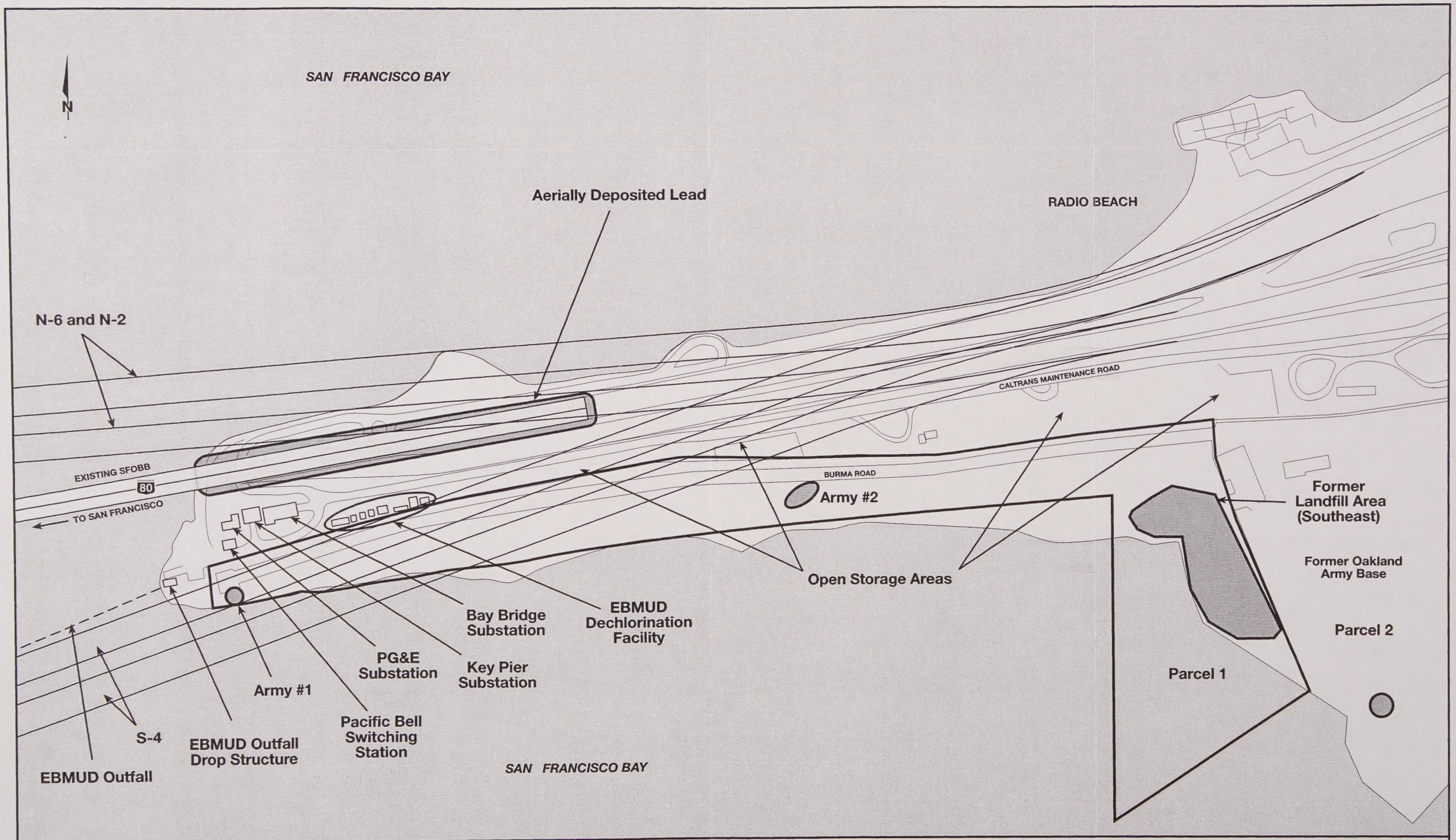


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Potential Contaminant Sources
Yerba Buena Island

Figure 3-15a

7/5/00



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

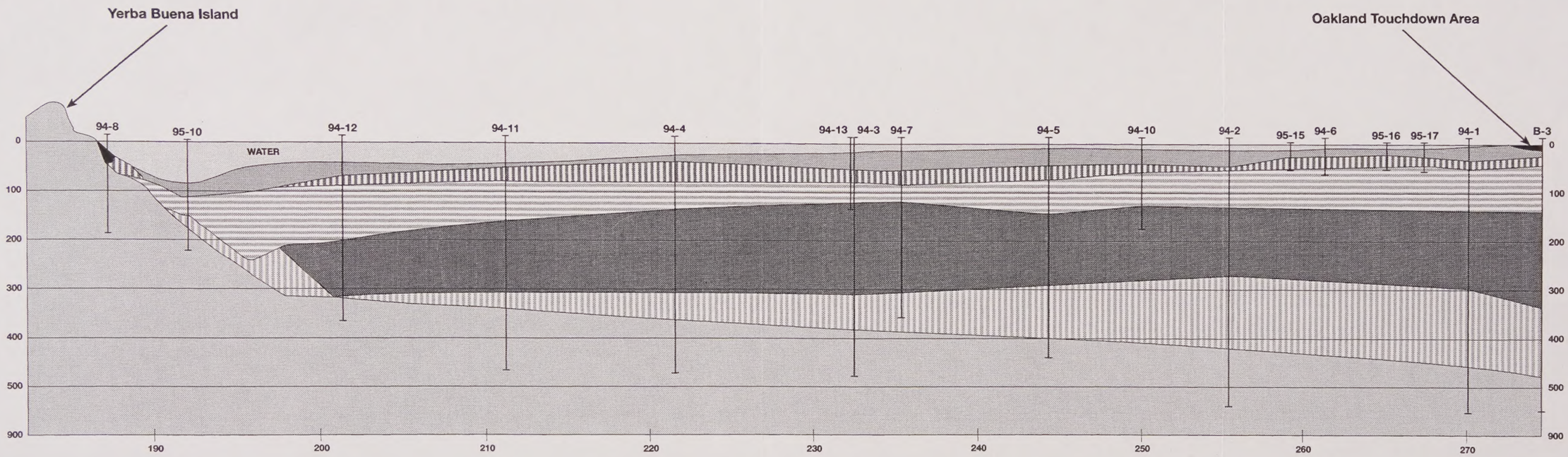
GRAPHIC SCALE 1:4,000

0 50 100 150 m

Potential Contaminant Sources
Oakland Touchdown Area

Figure 3-15b

4/25/01



PROFILE

STATIONING INTERVAL = 1000 FEET

VERTICAL EXAGGERATION = 3

ELEVATIONS REFER TO THE MEAN LOWER LOW WATER DATUM OF 1933 ((MLLW))

LEGEND

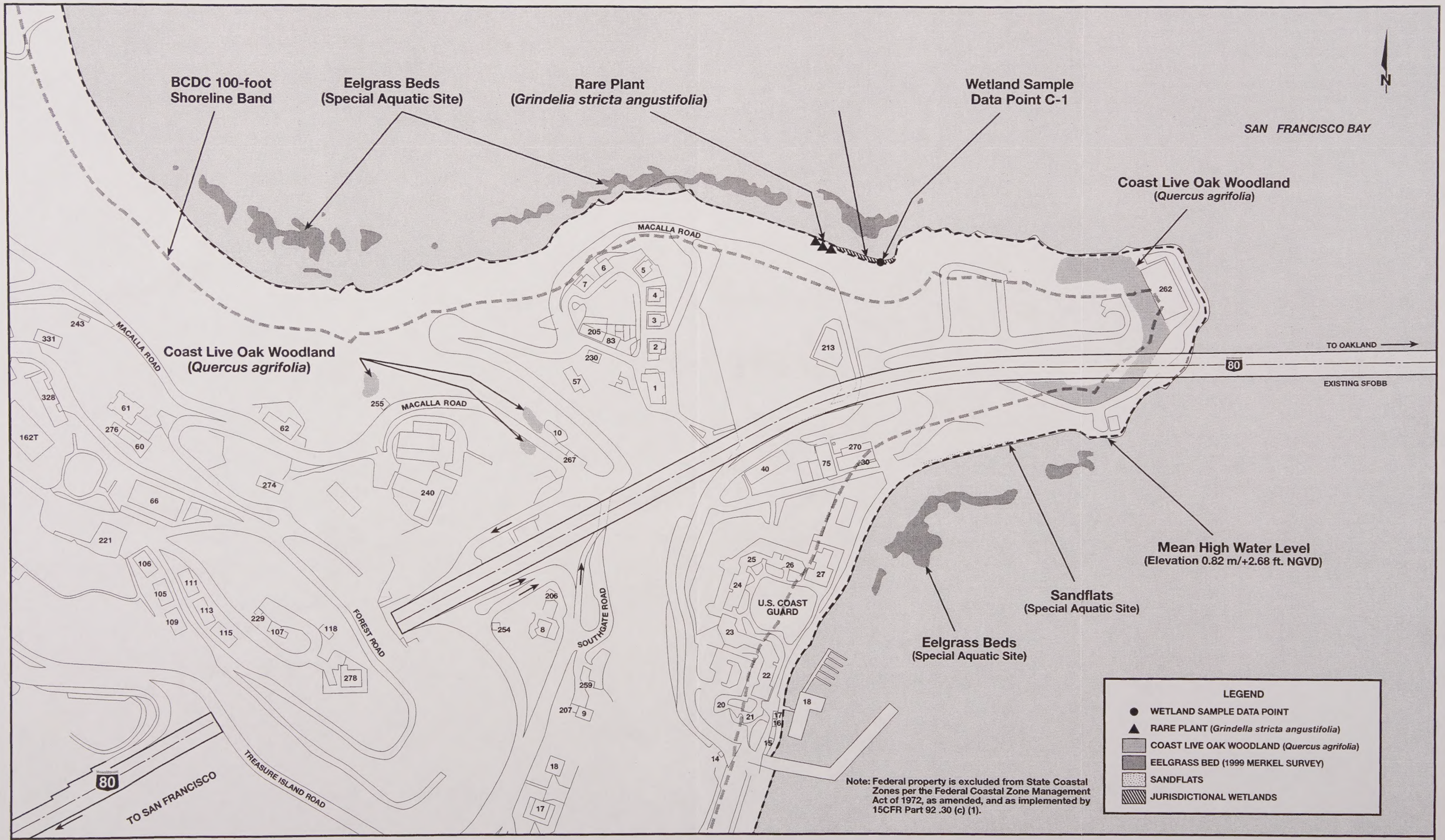
- FILL
- YOUNG BAY MUD
- MERRITT/POSEY/SAN ANTONIO FORMATION
- YERBA BUENA MUD (OLD BAY MUD)
- UPPER ALAMEDA FORMATION
- LOWER ALAMEDA FORMATION
- FRANCISCAN BEDROCK

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Geologic Profile of the Project Area

Figure 3-16

2/3/01

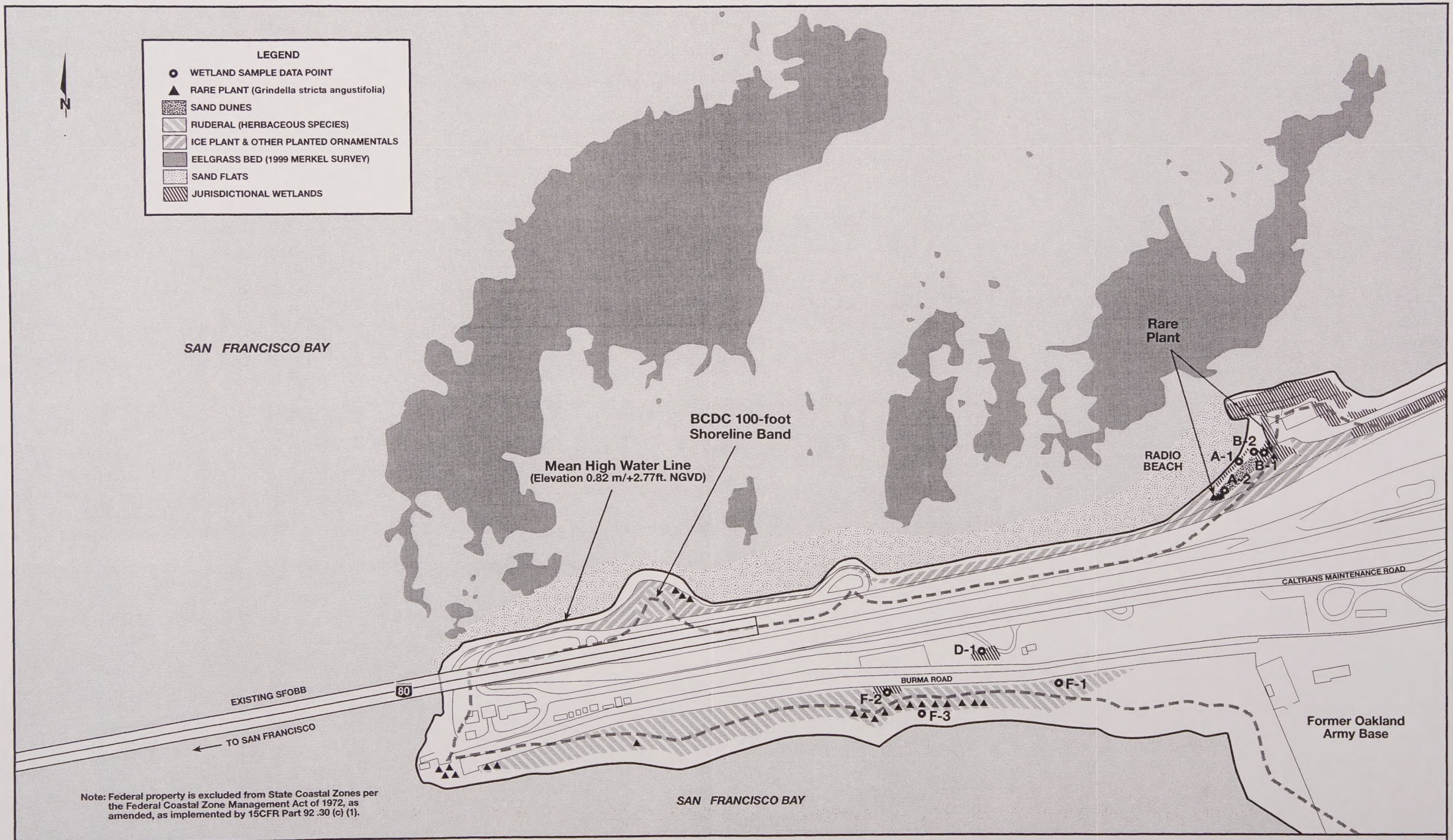


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Biological Resources
Yerba Buena Island

Figure 3-17

4/5/01



Note: Federal property is excluded from State Coastal Zones per the Federal Coastal Zone Management Act of 1972, as amended, as implemented by 15CFR Part 92 .30 (c) (1).

SFOBB EAST SPAN SEISMIC SAFETY PROJECT

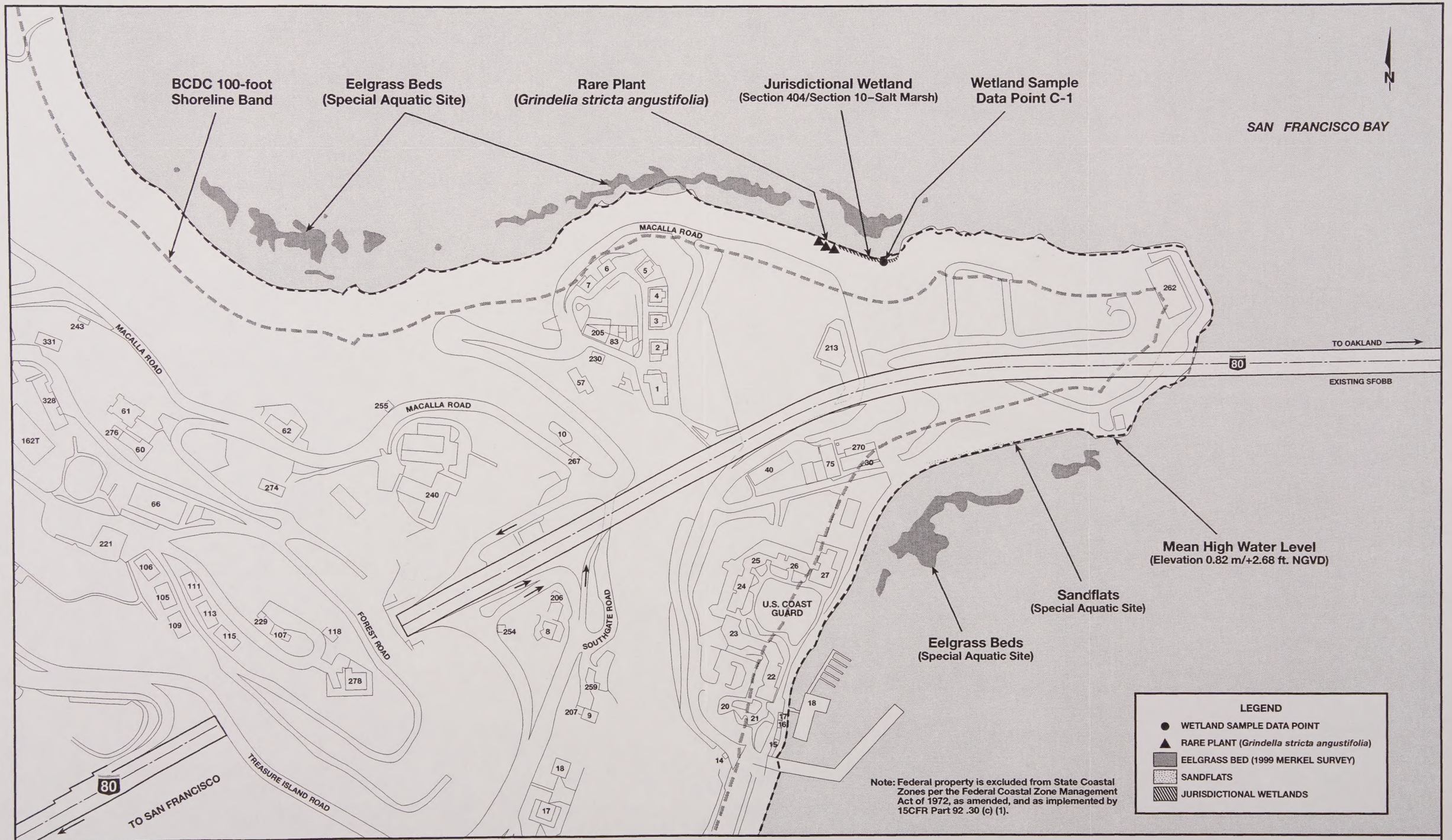
GRAPHIC SCALE 1:5,000

0 50 100 150 m

Biological Resources
Oakland Touchdown Area

Figure 3-18

4/5/01

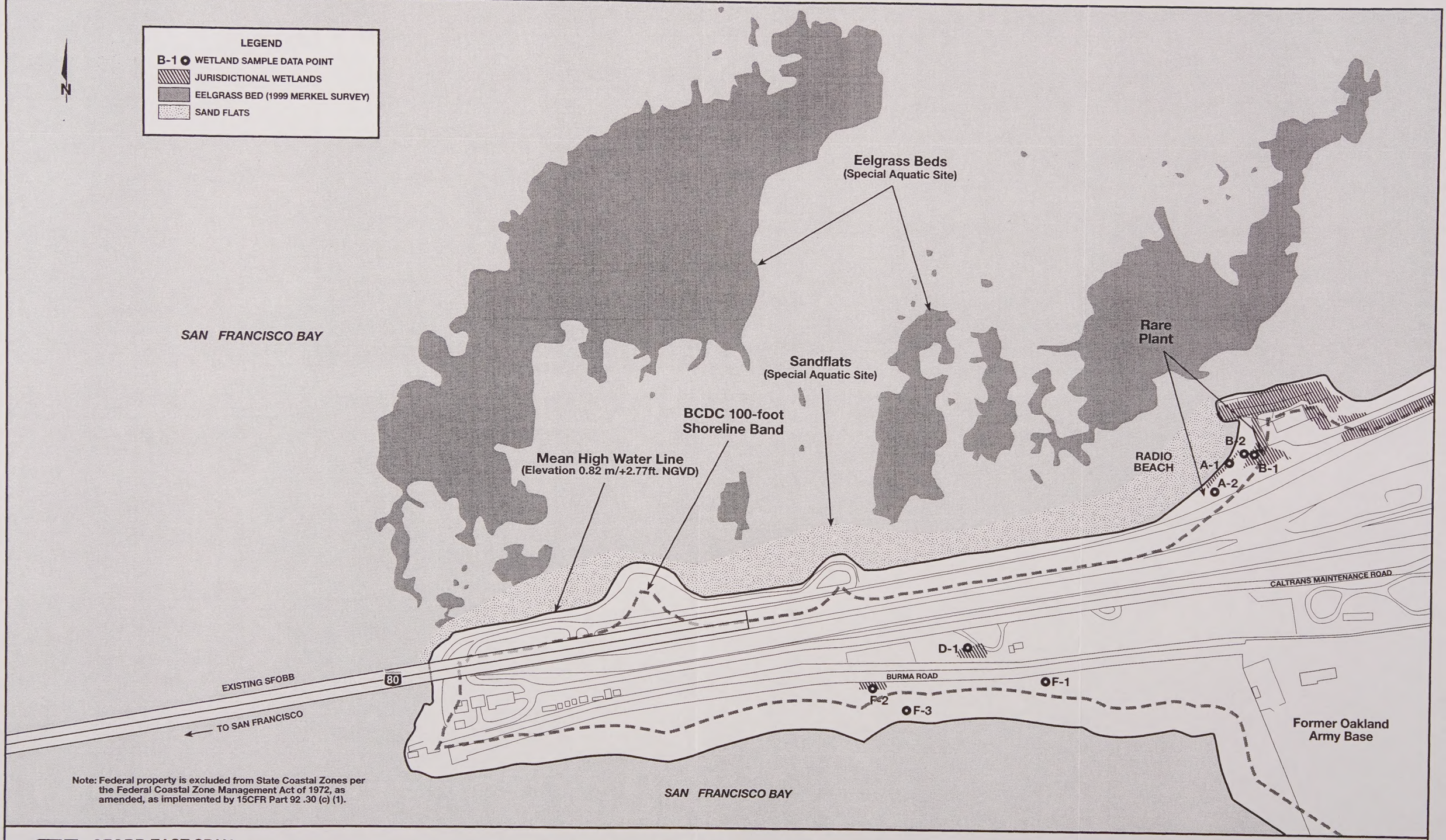


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Wetlands and Special Aquatic Sites
Yerba Buena Island

Figure 3-19

4/25/01



Note: Federal property is excluded from State Coastal Zones per the Federal Coastal Zone Management Act of 1972, as amended, as implemented by 15CFR Part 92 .30 (c) (1).

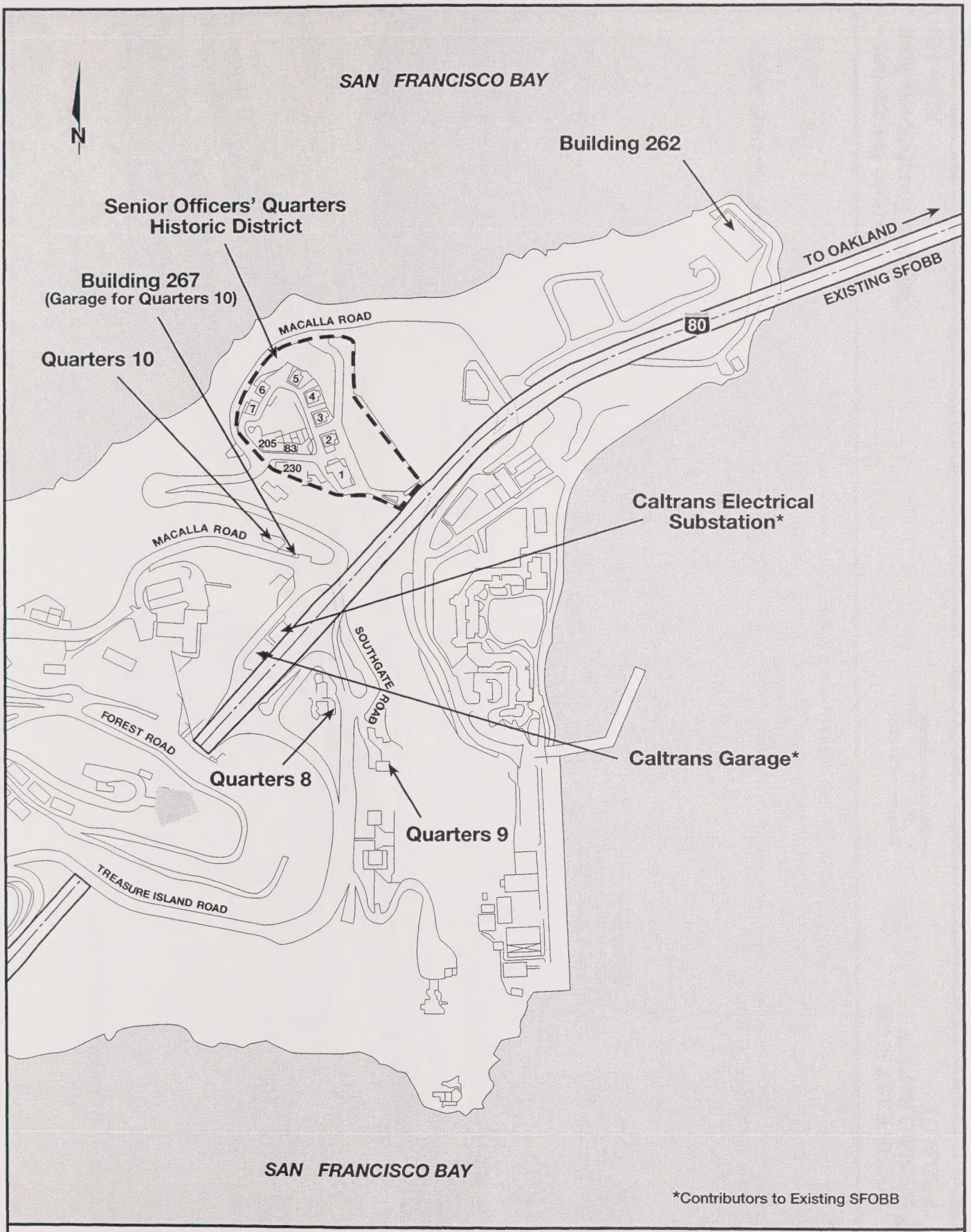
SFOBB EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:5,000
0 50 100 150 m

Wetlands and Special Aquatic Sites
Oakland Touchdown Area

Figure 3-20

4/25/01



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

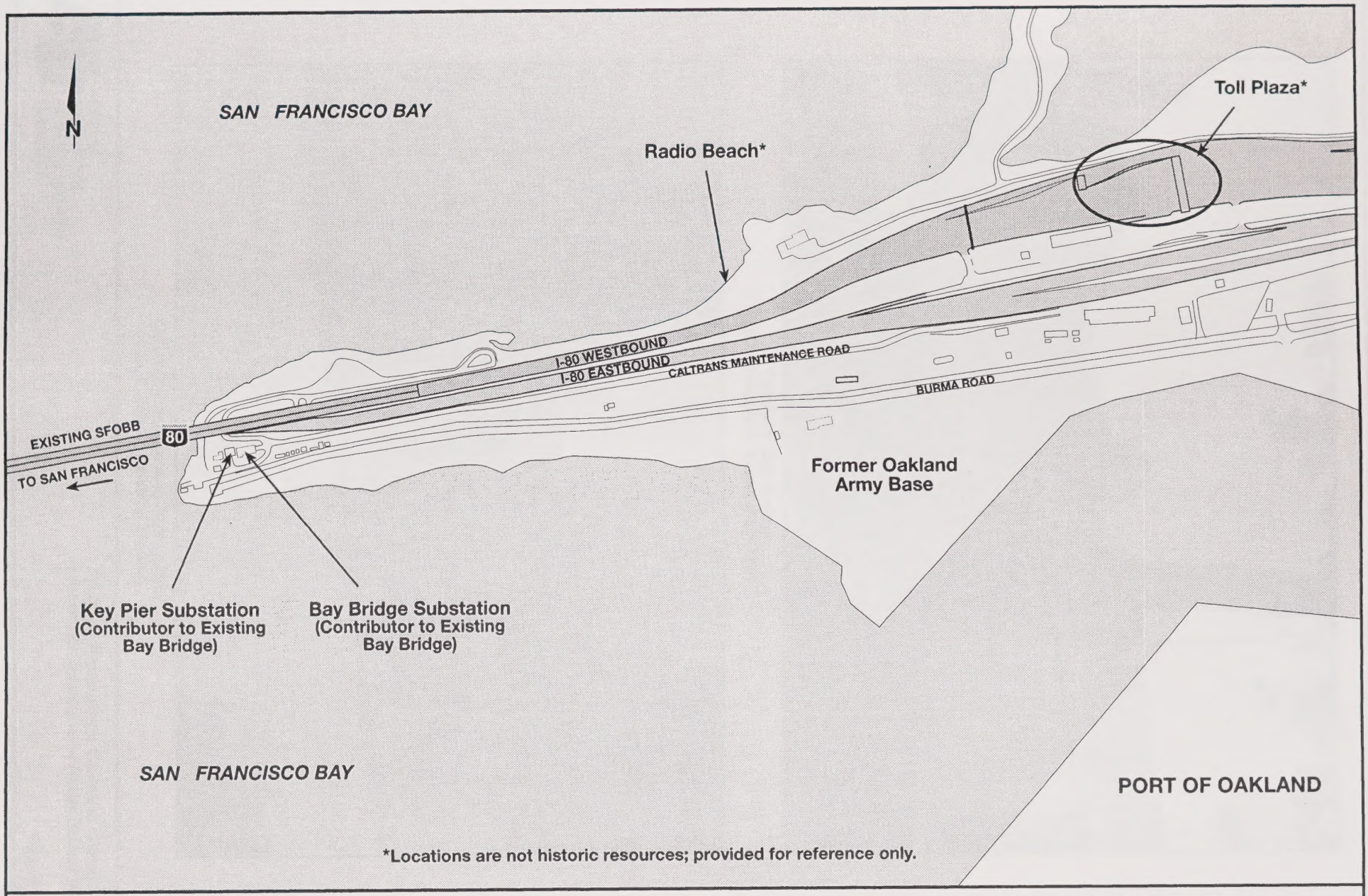
GRAPHIC SCALE 1:5,000

0 100 200m

Historic Resources
Yerba Buena Island

Figure 3-21

9/10/00



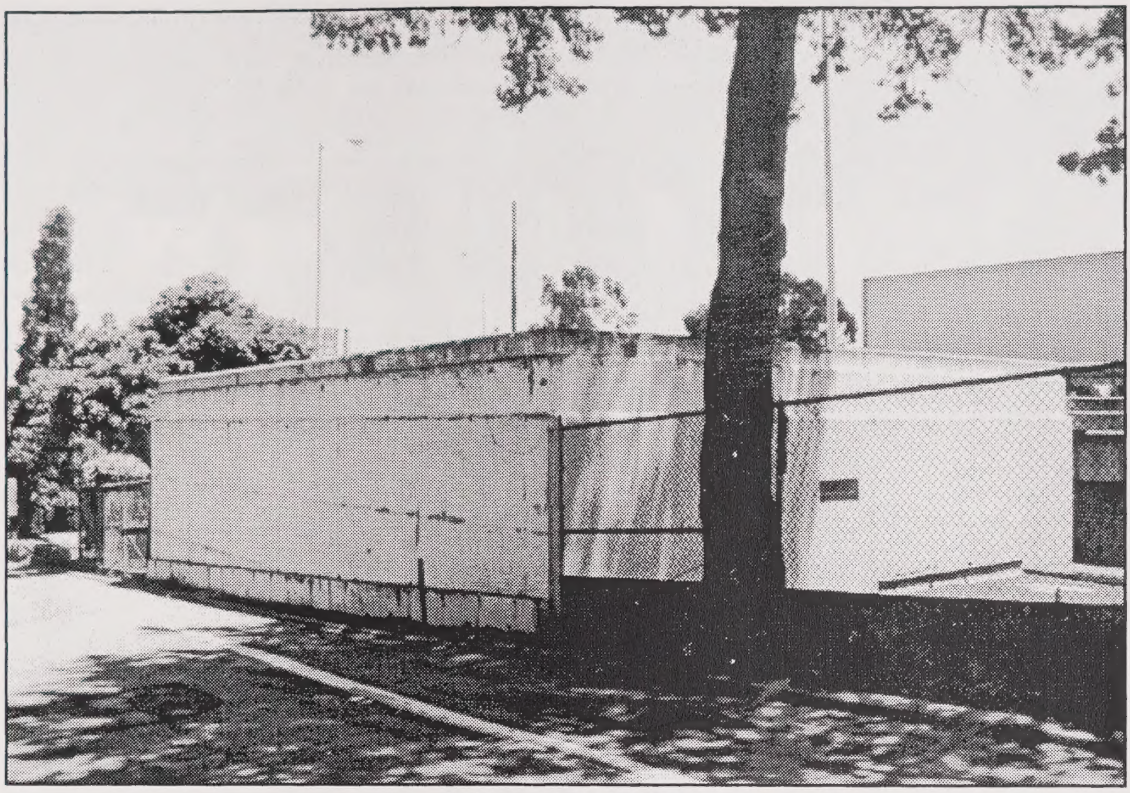
SFOBB EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:8,000
0 50 100 200 m

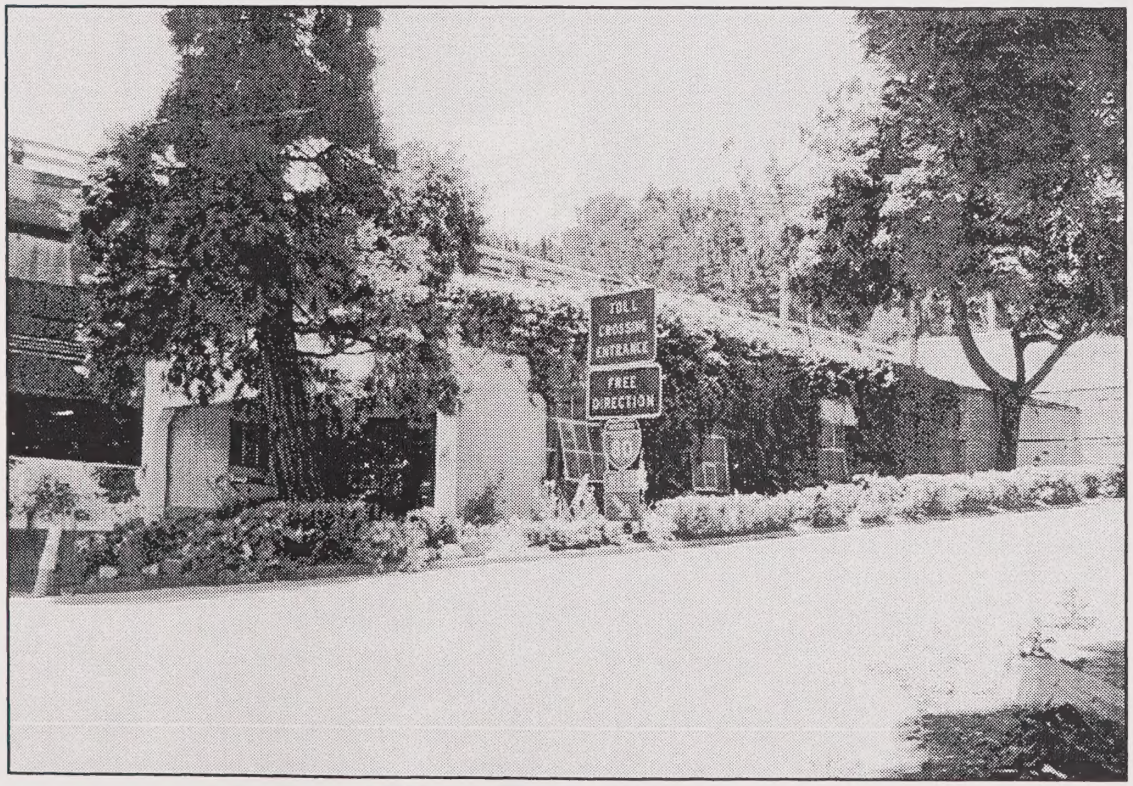
Historic Resources–
Oakland Touchdown Area

Figure 3-22

4/12/01



Caltrans Substation
(Contributor to Existing SFOBB)



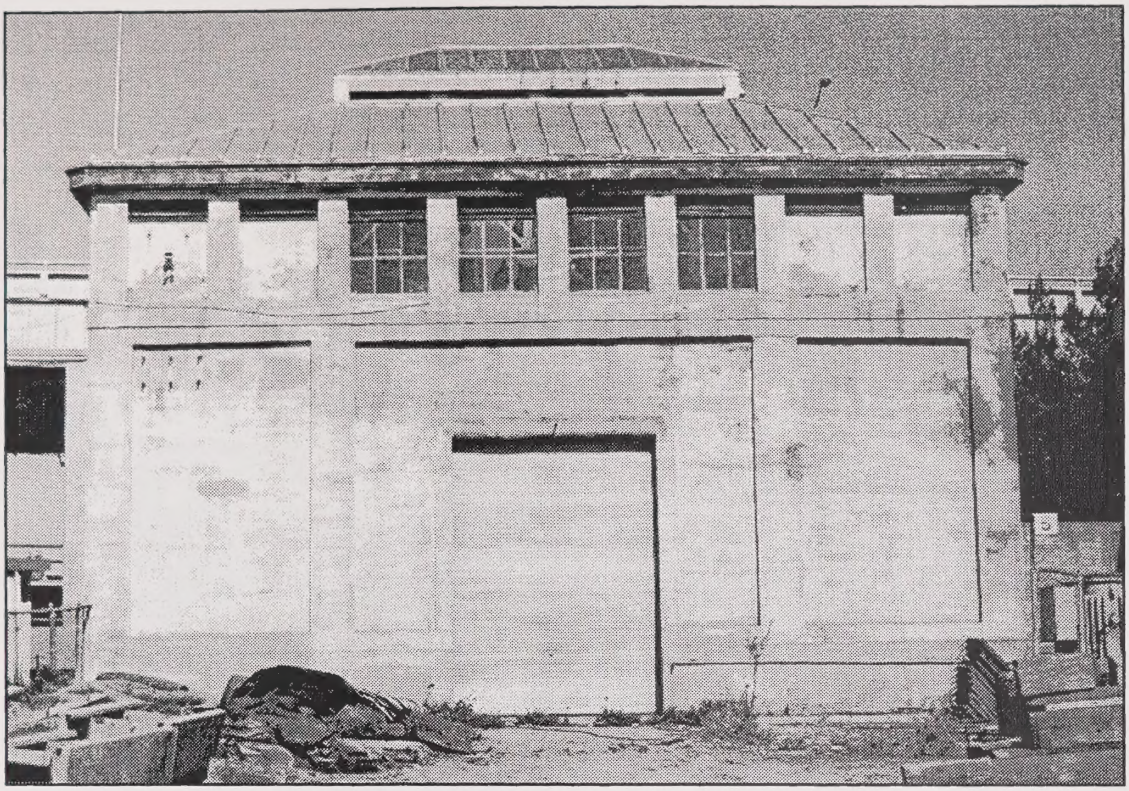
Caltrans Garage and Substation
(Contributor to Existing SFOBB)

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Historic Resources: Caltrans Garage and Electrical Substation–Yerba Buena Island

Figure 3-23

9/10/00



Key Pier Substation
(Individually Eligible and Contributor to Existing SFOBB)

Caltrans Electrical Substation
(Contributor to Existing SFOBB)

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Historic Resources: Caltrans Electrical Substation and Key Pier Substaion–Oakland Touchdown Area

Figure 3-24

Senior Officers' Quarters Historic District
(from left to right, Quarters 1-4; Quarters 5-7 are out of view to the northwest)

Quarters 1

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Historic Resources: Senior Officers' Quarters Historic District
and Quarters 1–Yerba Buena Island

Figure 3-25

9/10/00

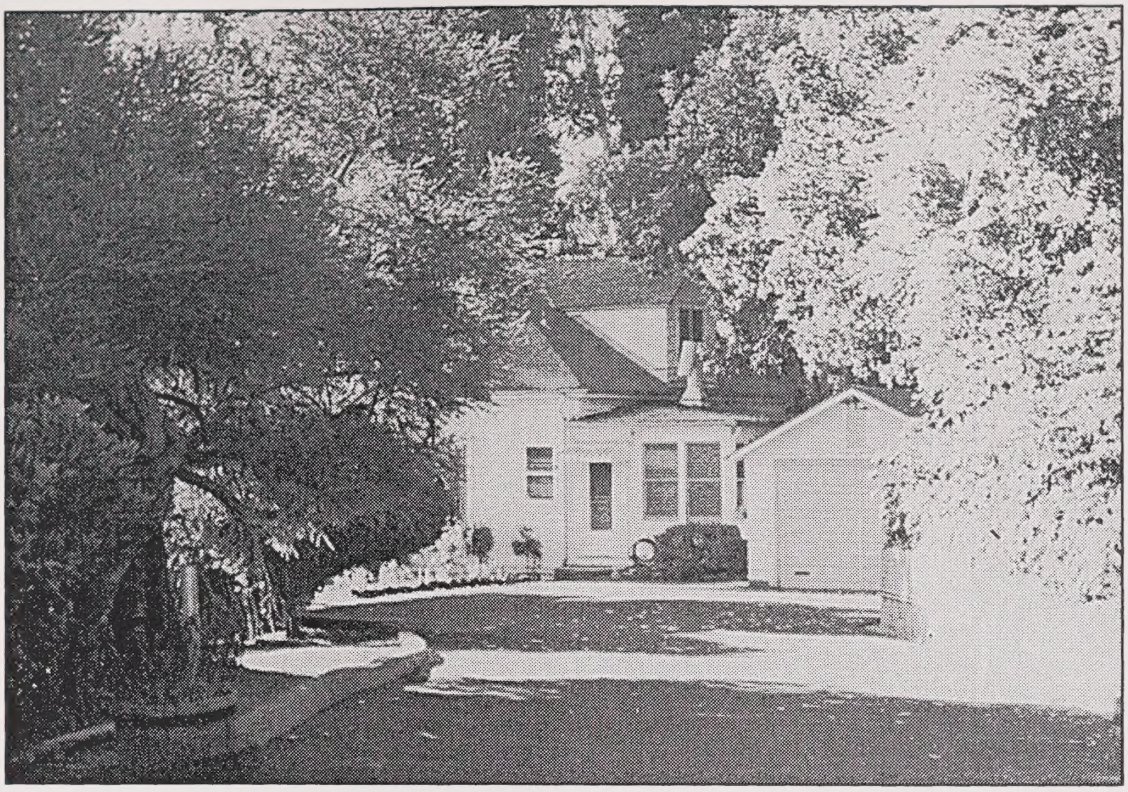
Quarters 8

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

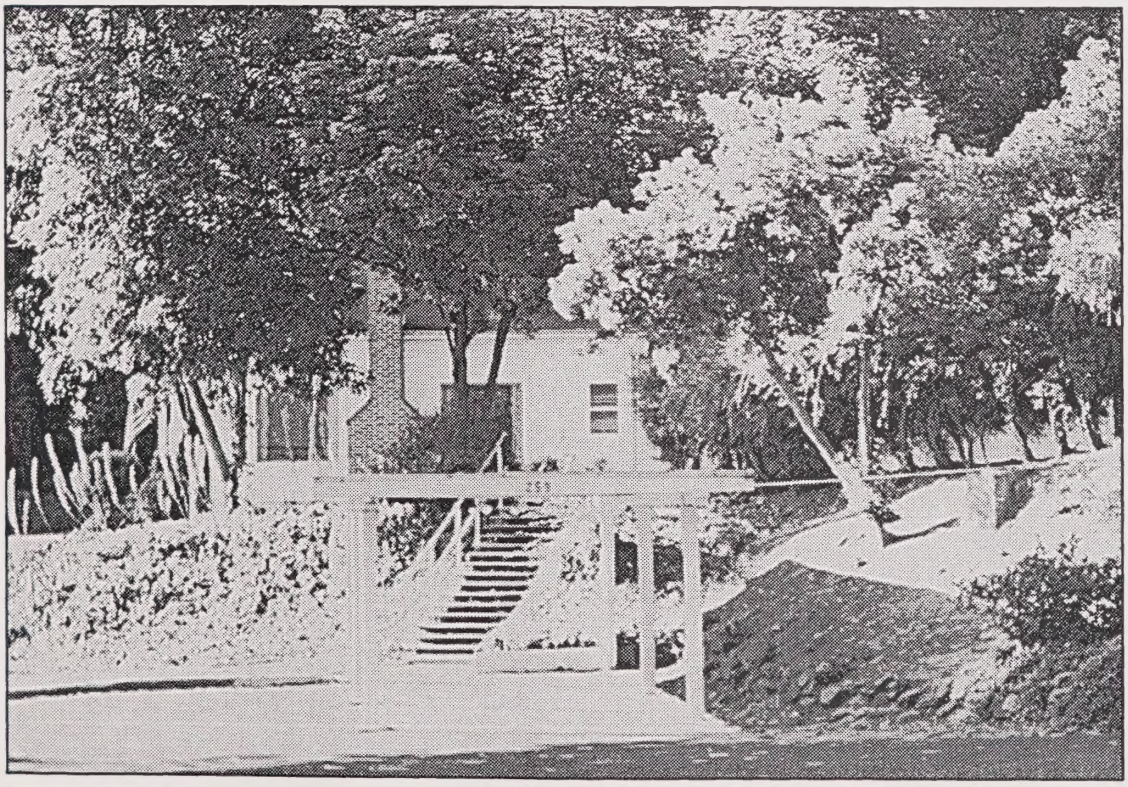
Historic Resources: Quarters 8
–Yerba Buena Island

Figure 3-26

9/10/98



Quarters 9



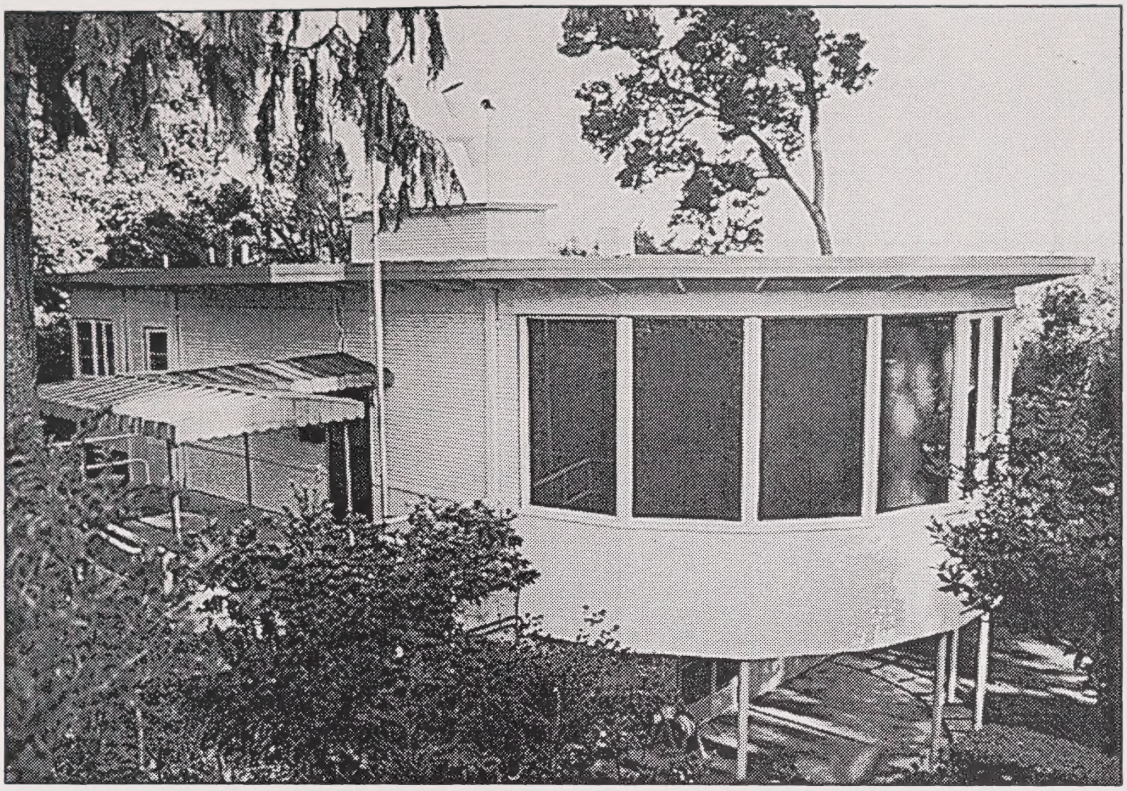
Quarters 9

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

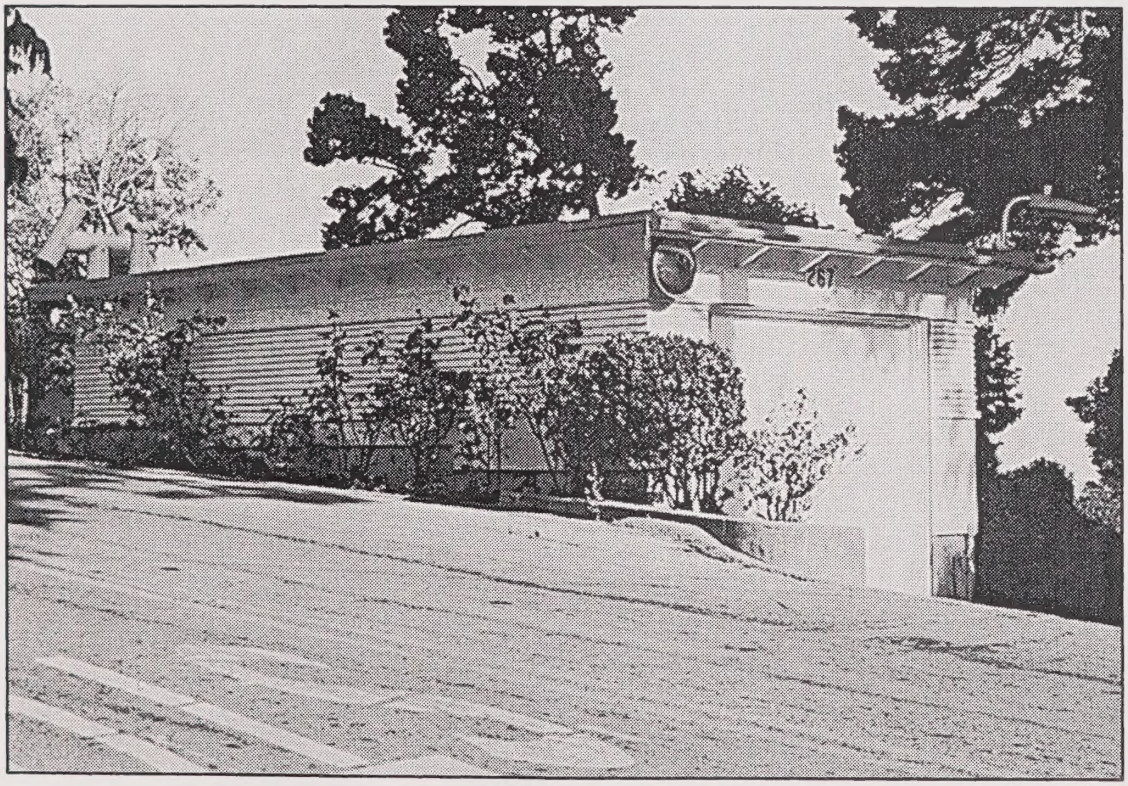
Historic Resources: Quarters 9
–Yerba Buena Island

Figure 3-27

9/10/98



Quarters 10



Building 267

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Historic Resources: Quarters 10 and Garage
(Building 267)–Yerba Buena Island

Figure 3-28

9/10/98

Building 262

SAN FRANCISCO BAY

MACALLA ROAD

MACALLA ROAD

SOUTHGATE ROAD

TO OAKLAND

SAN FRANCISCO BAY

LEGEND

- ELECTRICAL (HIGH RISK)
- TELEPHONE
- GAS (HIGH RISK)
- SEWER
- WATER

SFOBB EAST SPAN SEISMIC SAFETY PROJECT

GRAPHIC SCALE 1:5,000

0 50 100 150 m

Existing Major Utilities
Yerba Buena Island

Figure 3-30a

4/25/01

SAN FRANCISCO BAY

TO SAN FRANCISCO

BURMA ROAD

SAN FRANCISCO BAY

LEGEND

- ELECTRICAL (HIGH RISK)
- TELEPHONE
- GAS (HIGH RISK)
- SEWER
- WATER

SFOBB EAST SPAN SEISMIC SAFETY PROJECT

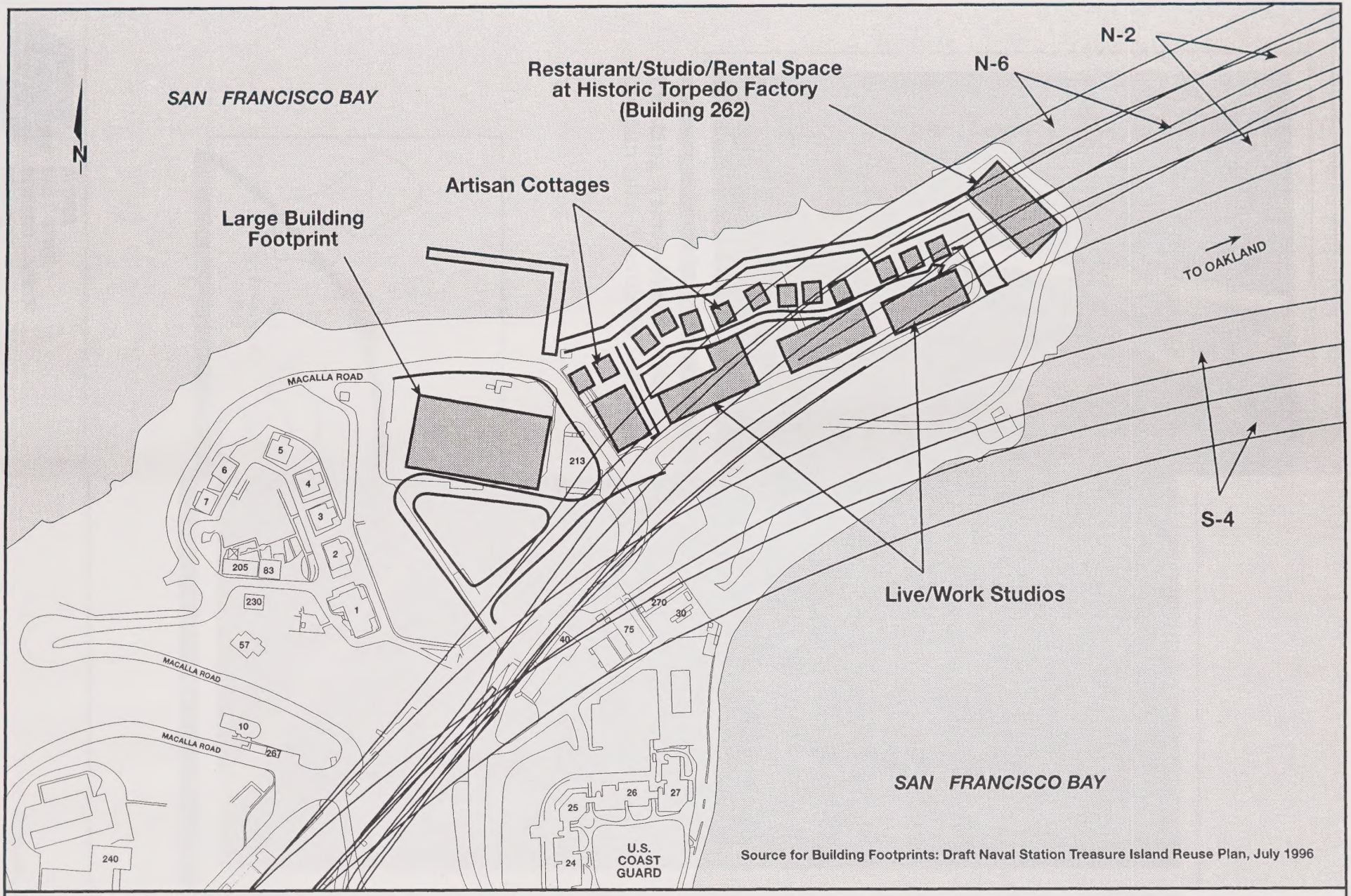
GRAPHIC SCALE 1:5,000

0 50 100 150 m

Existing Major Utilities Oakland Touchdown Area

Figure 3-30b

4/25/01



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

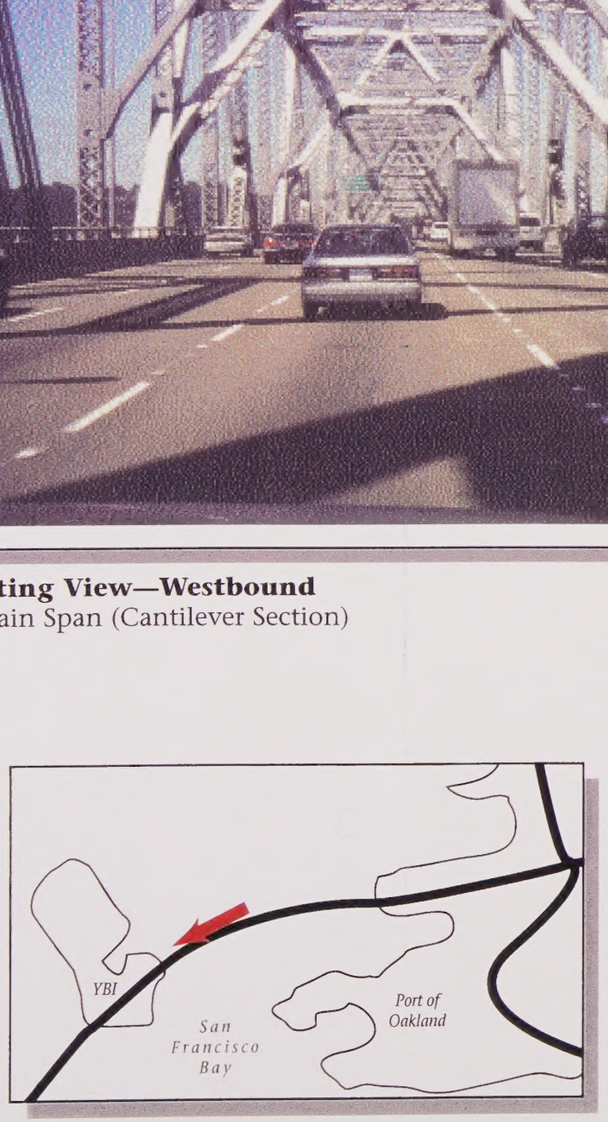
GRAPHIC SCALE 1:3,000

0 25 50 100 m

Potential Project Impacts on Development Scenarios–Yerba Buena Island

Figure 4-1

Existing View—Westbound
In Main Span (Cantilever Section)

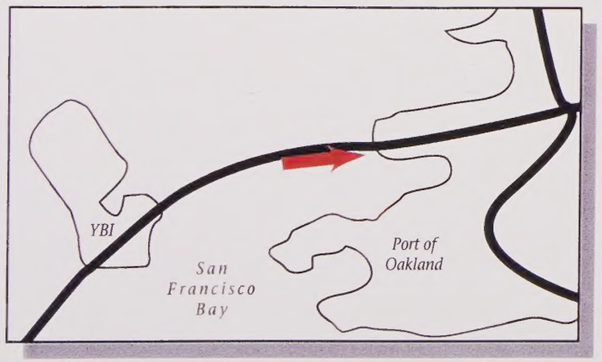


Simulation of Proposed Project
Westbound View in Main Span (Self-Anchored Suspension Section)

Existing View—Eastbound
Just East of YBI Tunnel

Simulation of Proposed Project
Eastbound View Just East of YBI Tunnel

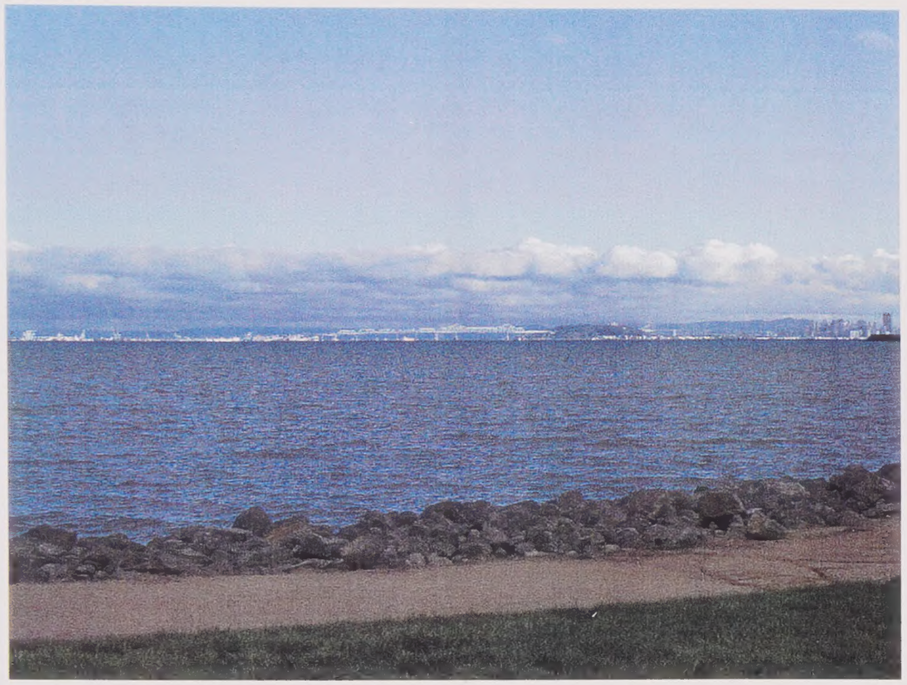
Existing View—Eastbound
In Decline Section



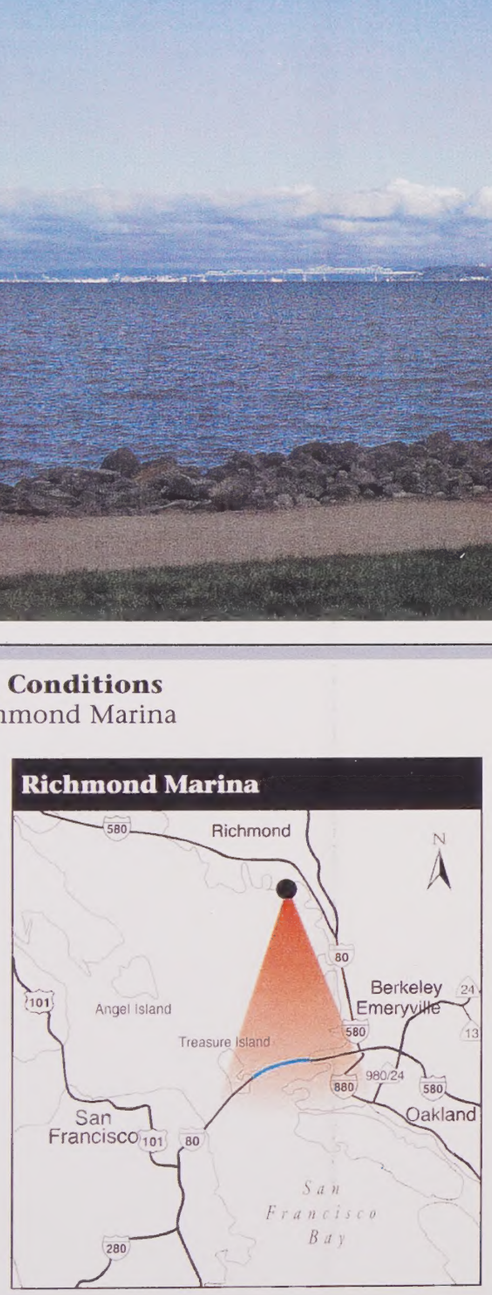
Simulation of Proposed Project
Eastbound View In Decline Section

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

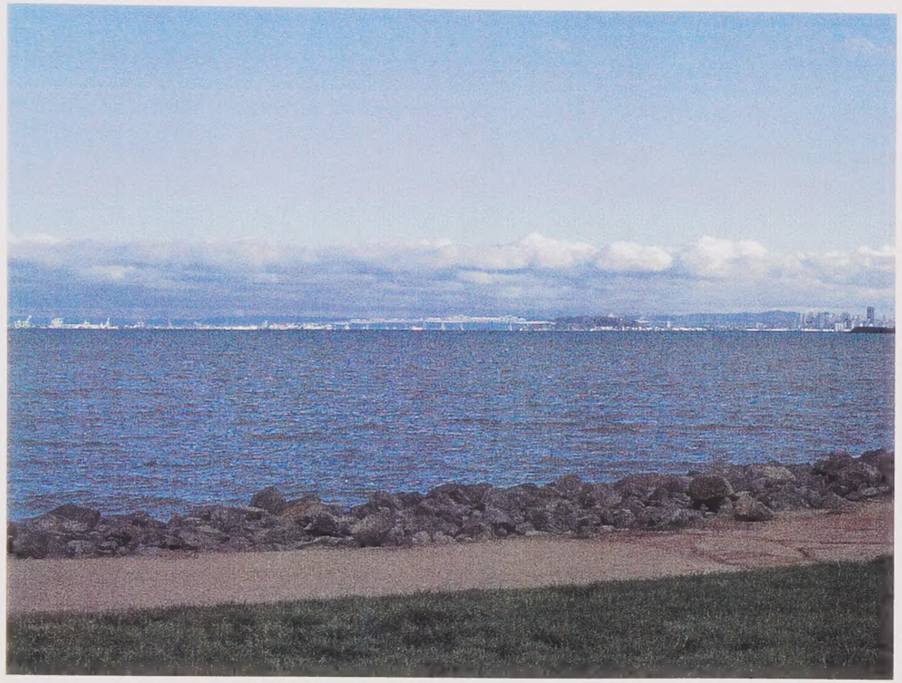
Figure 4-3b



Existing Conditions
From Richmond Marina



Simulation of Proposed Project
Replacement Alternative N-6 Skyway Design Variation



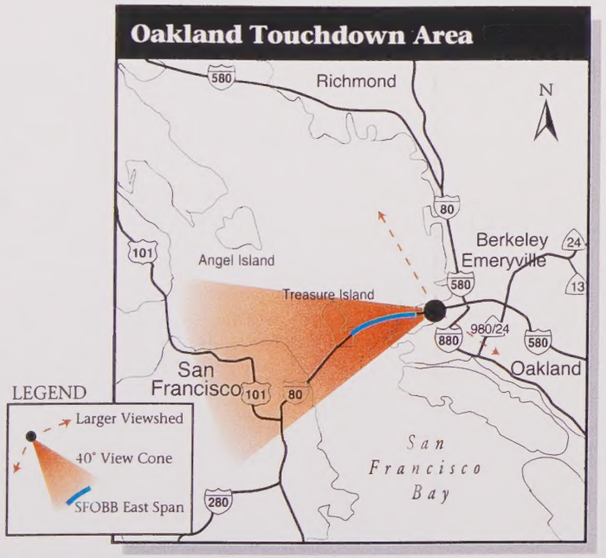
Existing Conditions
From Richmond Marina

Simulation of Proposed Project
Replacement Alternative N-6, Self-Anchored Suspension Design Variation

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Figure 4-5

Existing Conditions
From Oakland Touchdown Area

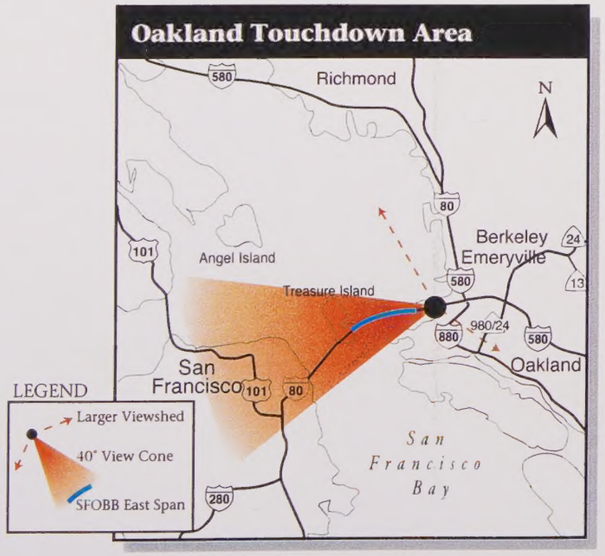


Simulation of Proposed Project
Replacement Alternative N-6, Skyway Design Variation

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

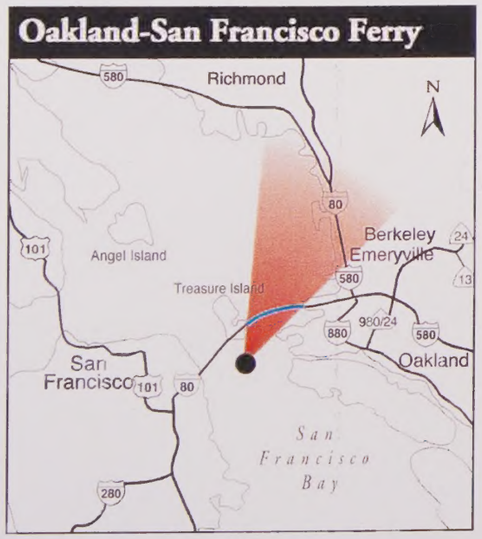
Figure 4-6

Existing Conditions
From Oakland Touchdown Area



Simulation of Proposed Project
Replacement Alternative S-4, Self-Anchored Suspension Design Variation

Existing Conditions
From Oakland-San Francisco Ferry

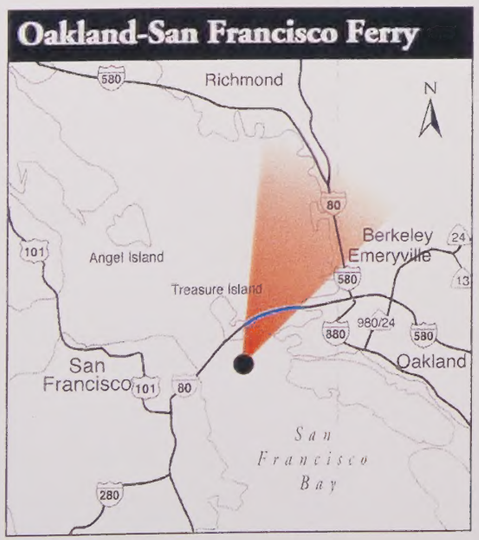


Simulation of Proposed Project
Replacement Alternative S-4, Skyway Design Variation

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Figure 4-8

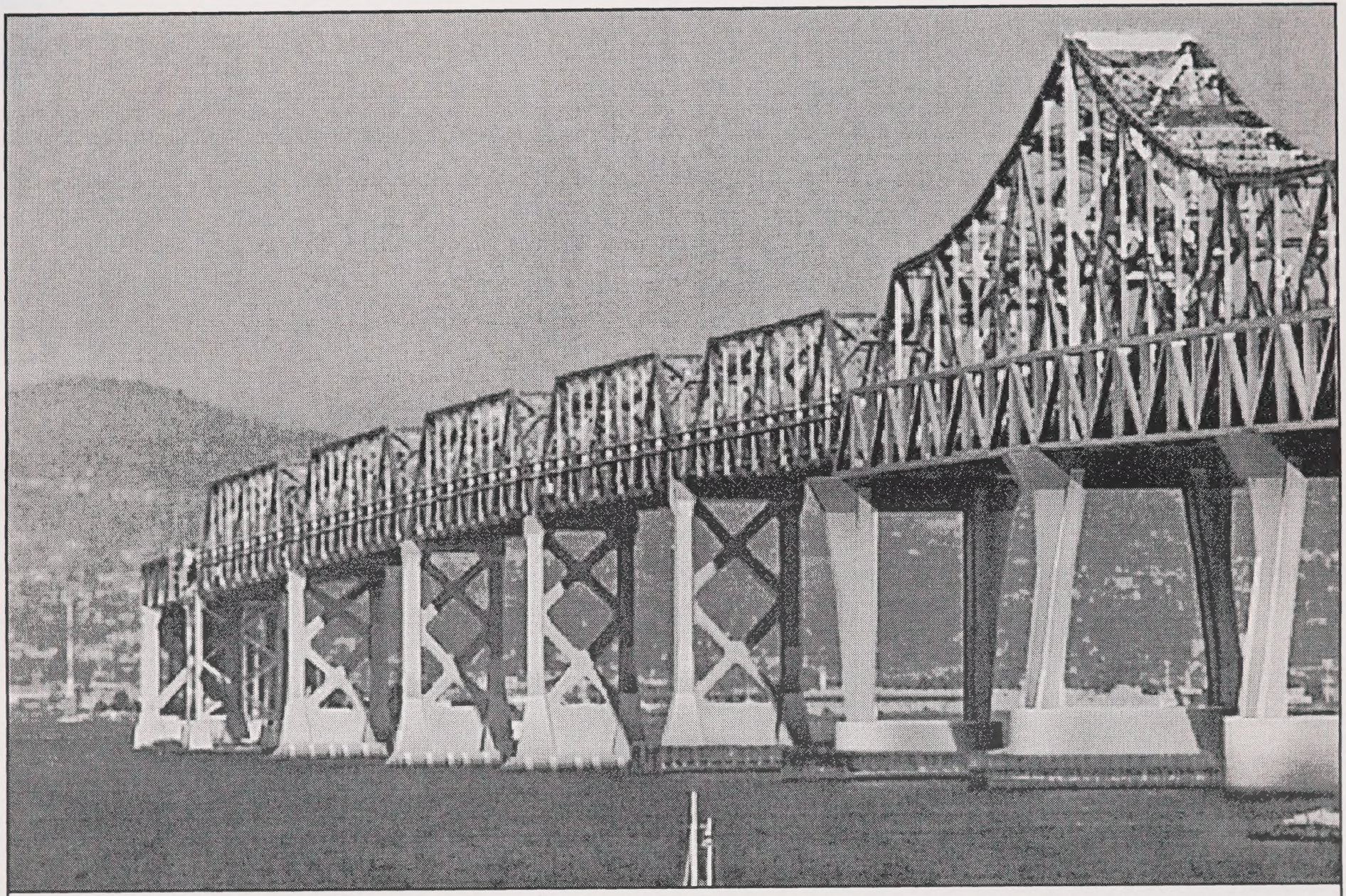
Existing Conditions
From Oakland-San Francisco Ferry



Simulation of Proposed Project
Replacement Alternative S-4, Cable-Stayed Design Variation

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Figure 4-9

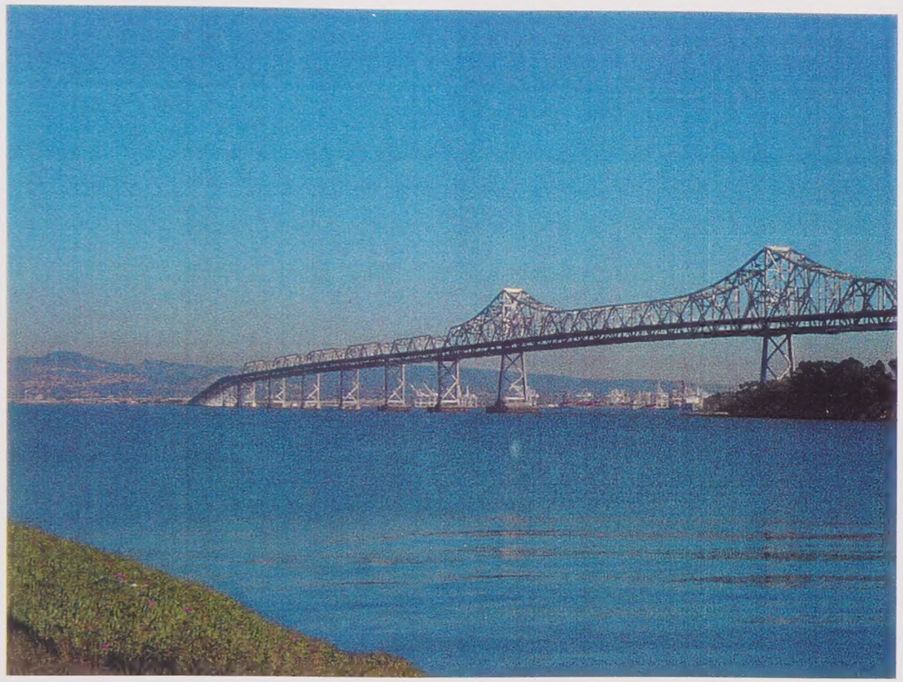


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Photo Simulation Retrofit Existing Bridge Design
from Treasure Island Viewpoint

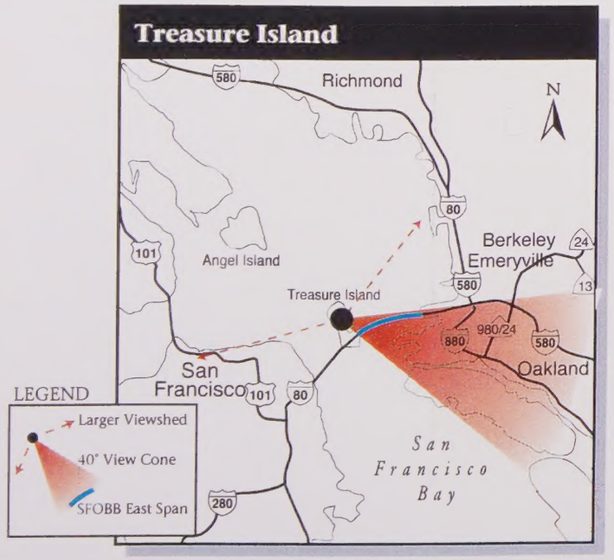
Figure 4-10

9/4/00



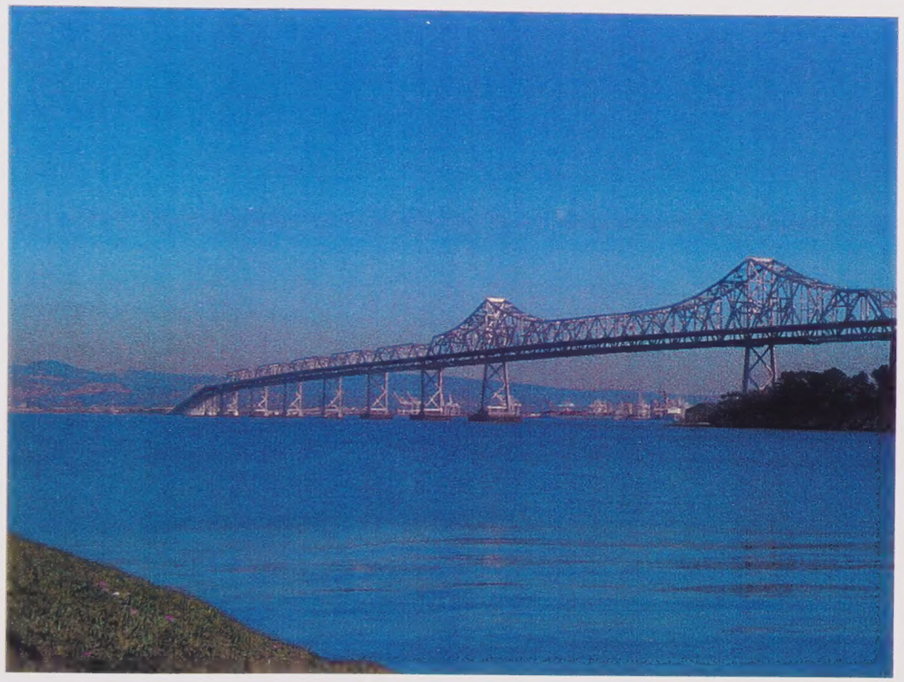
Existing Conditions
From Treasure Island

Simulation of Proposed Project
Replacement Alternative N-6, Skyway Design Variation



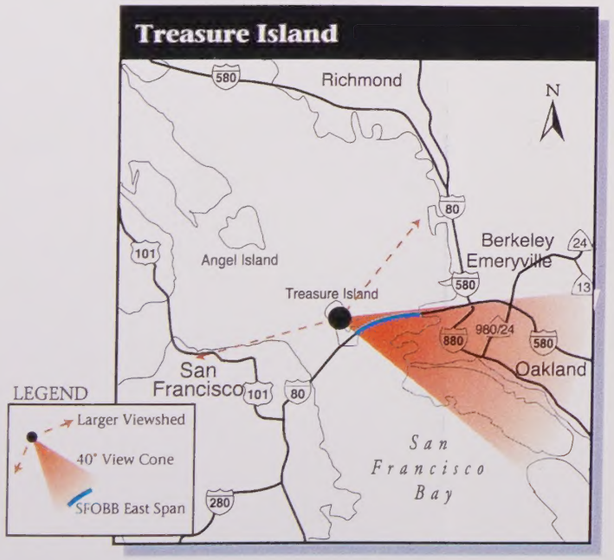
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Figure 4-11



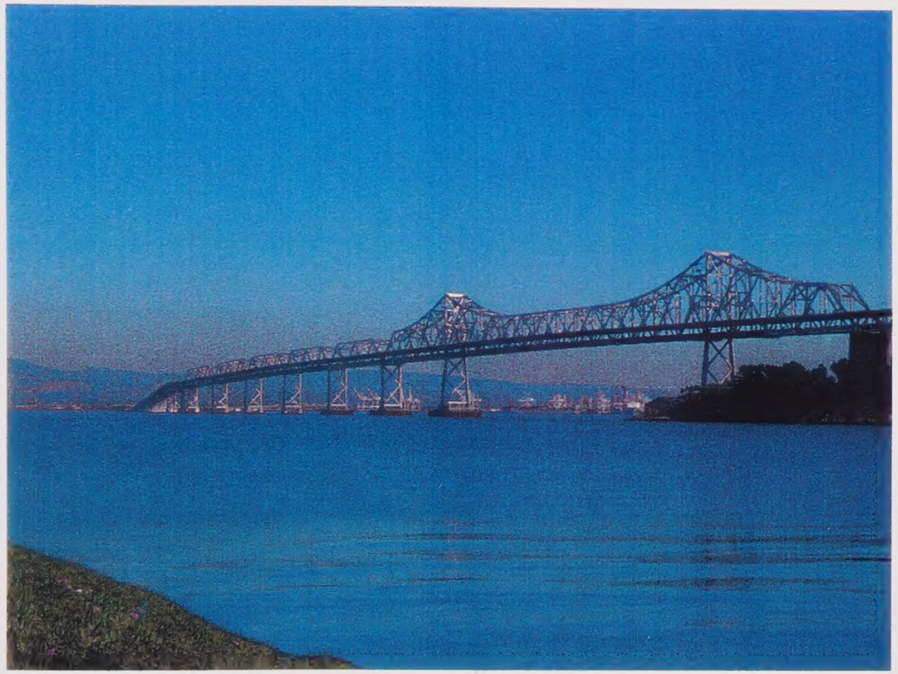
Existing Conditions
From Treasure Island

Simulation of Proposed Project
Replacement Alternative S-4, Skyway Design Variation

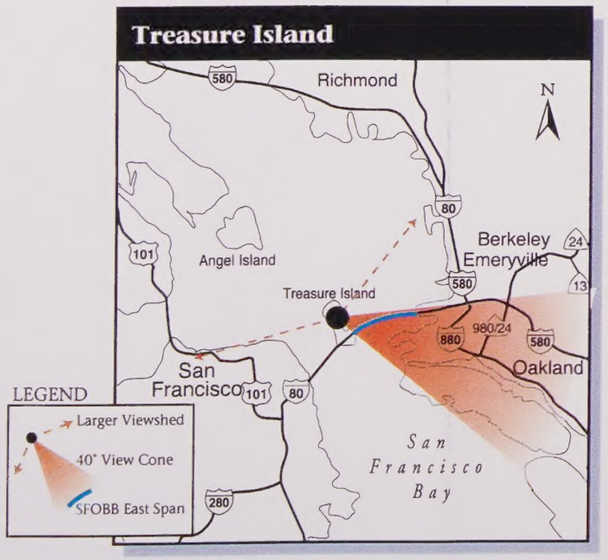


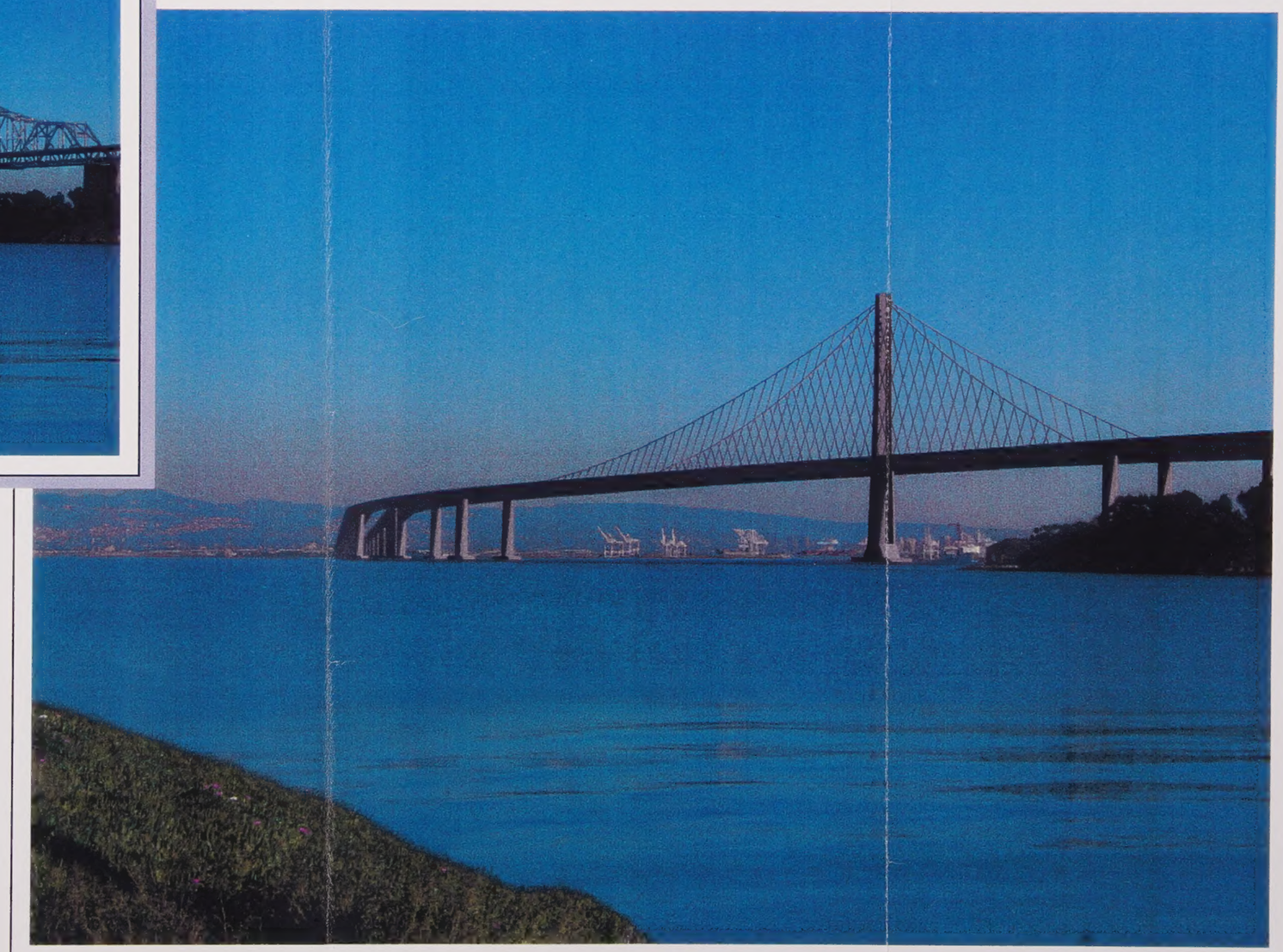
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Figure 4-12



Existing Conditions
From Treasure Island

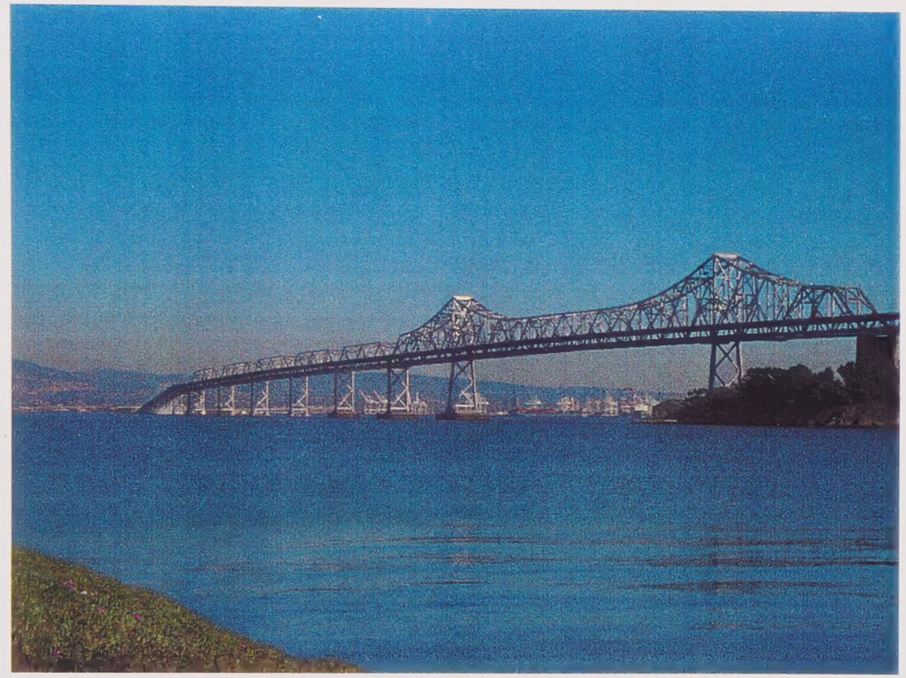




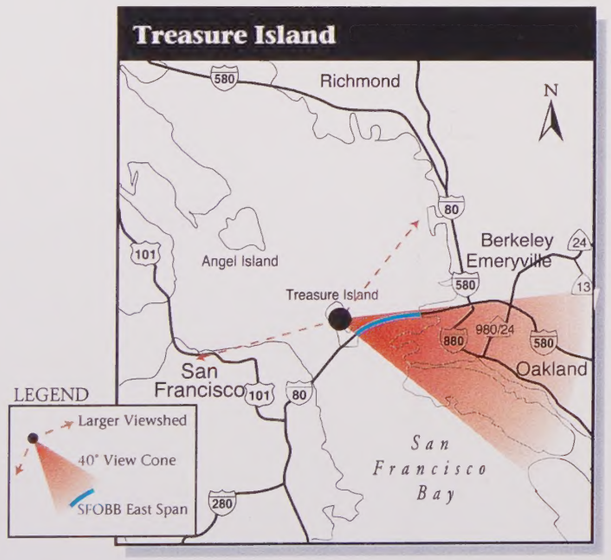
Simulation of Proposed Project
Replacement Alternative N-6, Self-Anchored Suspension Design Variation

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Figure 4-13

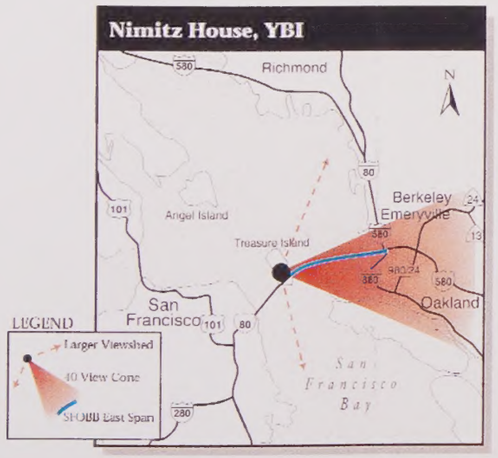


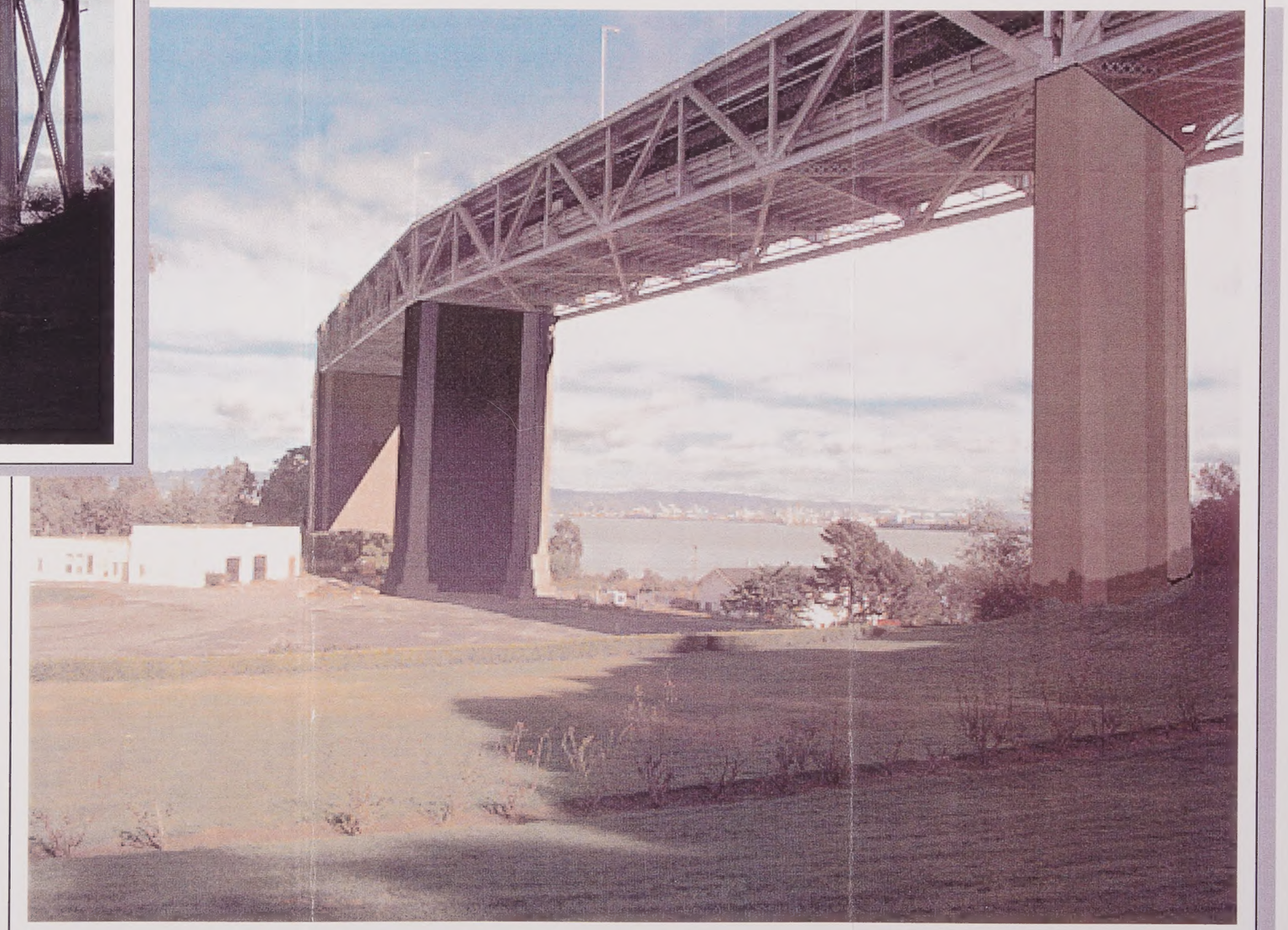
Existing Conditions
From Treasure Island



Simulation of Proposed Project
Replacement Alternative S-4, Self-Anchored Suspension Design Variation

Existing Conditions
View From Nimitz House (Quarters 1), YBI



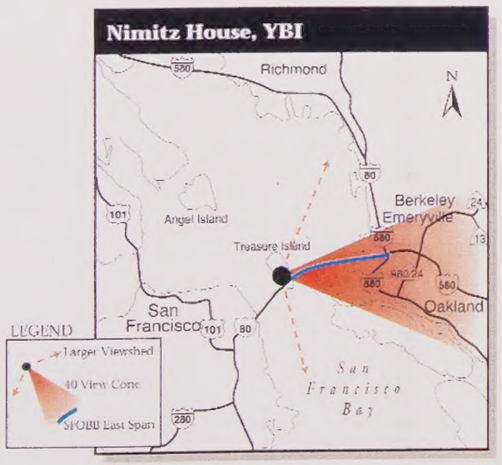


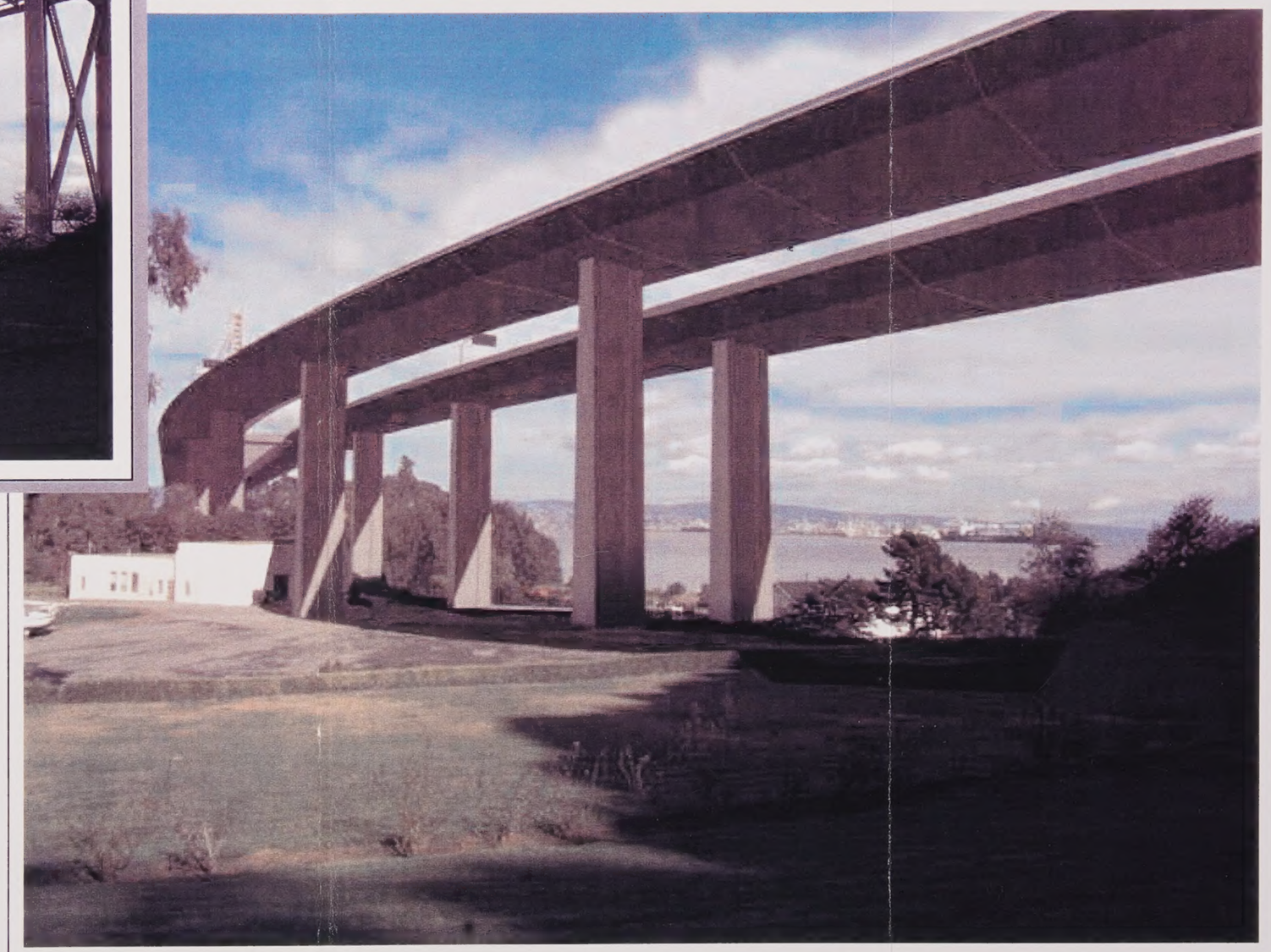
Simulation of Proposed Project
Retrofit Alternative

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Figure 4-15a

Existing Conditions
View From Nimitz House (Quarters 1), YBI



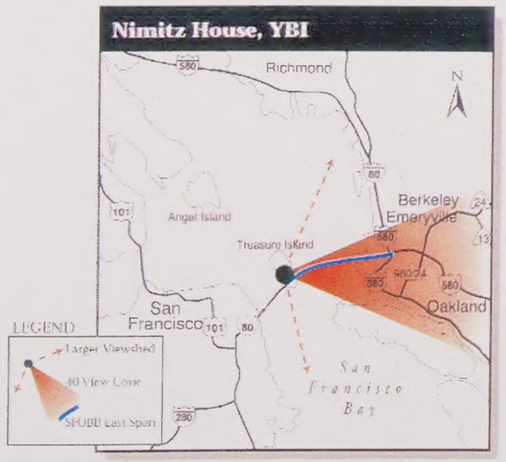


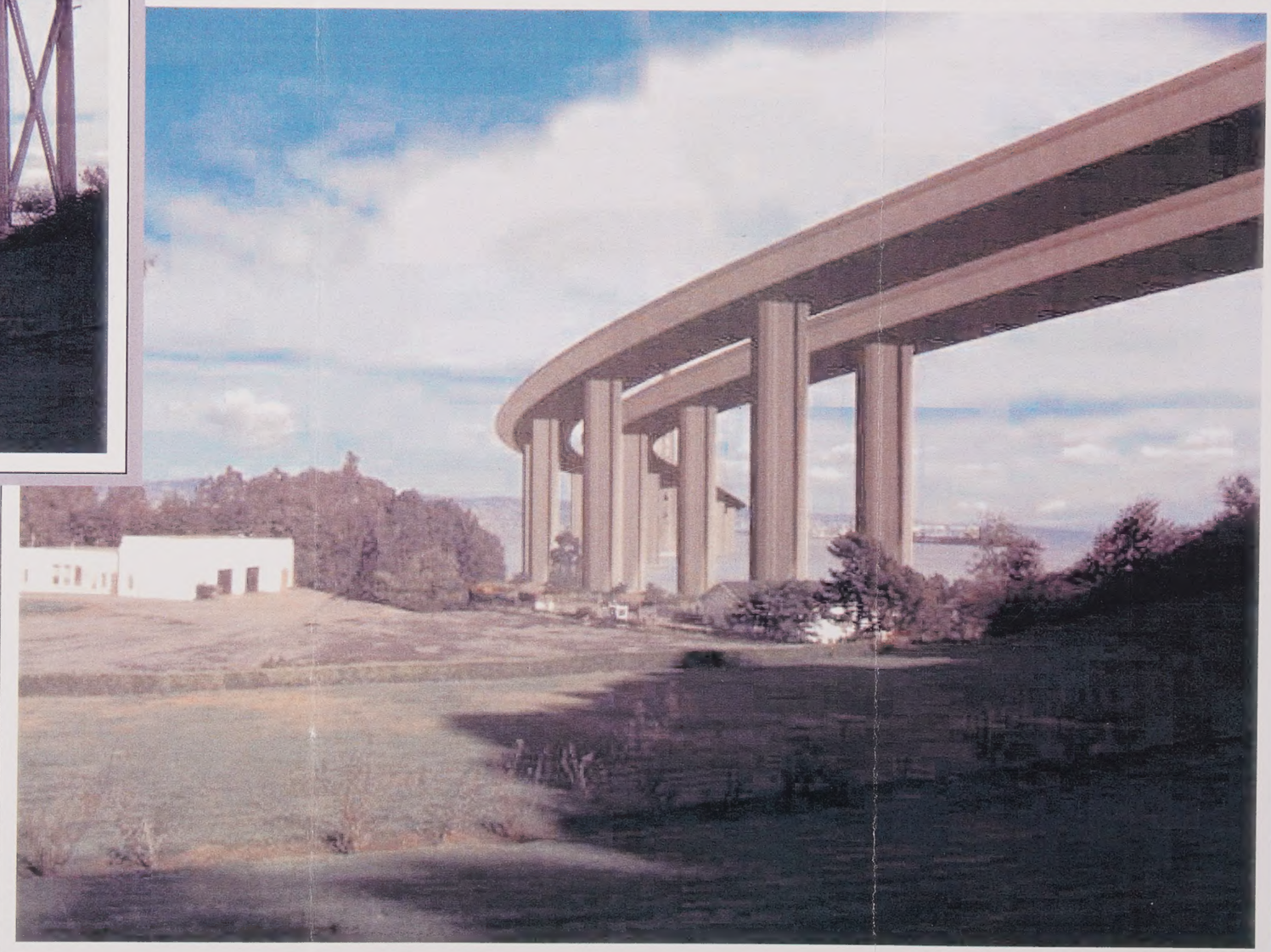
Simulation of Proposed Project
Replacement Alternative N-6, Self-Anchored Suspension Design Variation

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Figure 4-15b

Existing Conditions
View From Nimitz House (Quarters 1), YBI





Simulation of Proposed Project
Replacement Alternative S-4, Self-Anchored Suspension Design Variation

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Figure 4-15c

Existing Conditions
View Towards Nimitz House (Quarters 1)

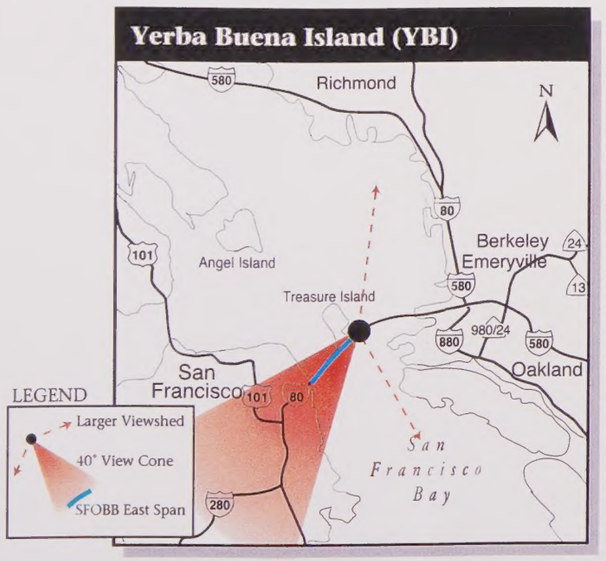
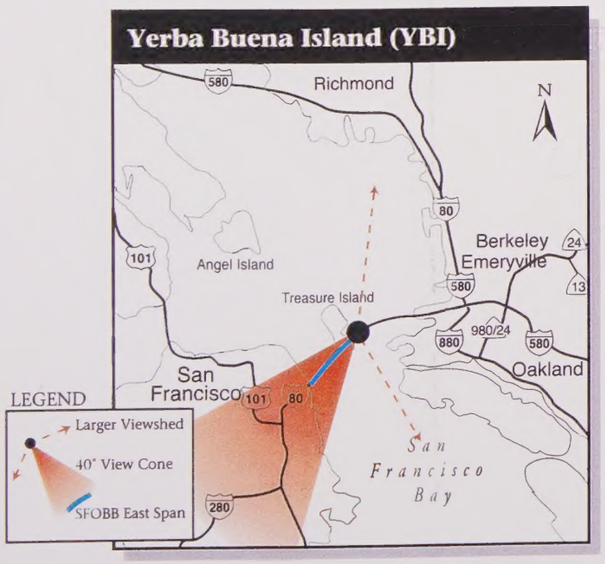


Photo Simulation View towards Nimitz House (Quarters 1), YBI
Retrofit Alternative

Existing Conditions
View Towards Nimitz House (Quarters 1)

Photo Simulation View towards Nimitz House (Quarters 1), YBI
Replacement Alternative N-6 Self-Anchored Suspension Bridge Design Variation



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Figure 4-16b

Existing Conditions
View Towards Nimitz House (Quarters 1)

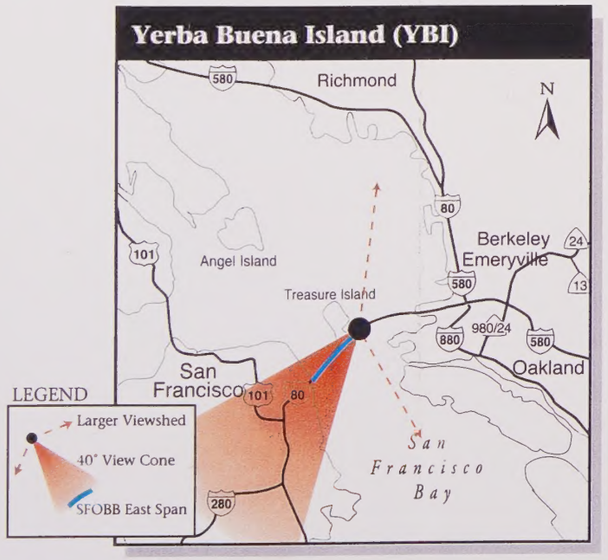
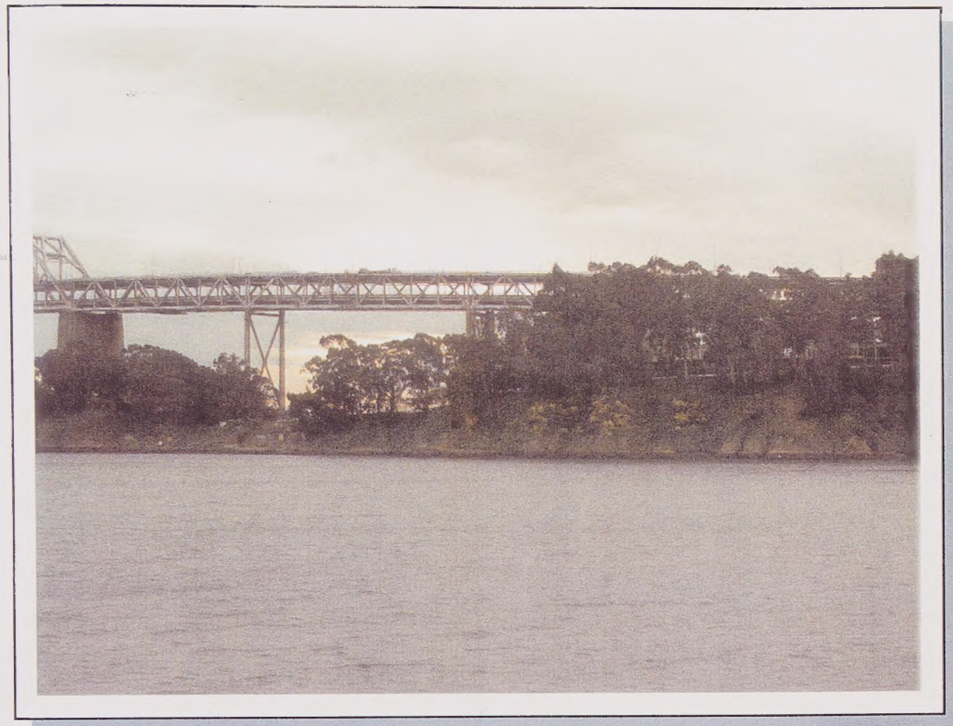
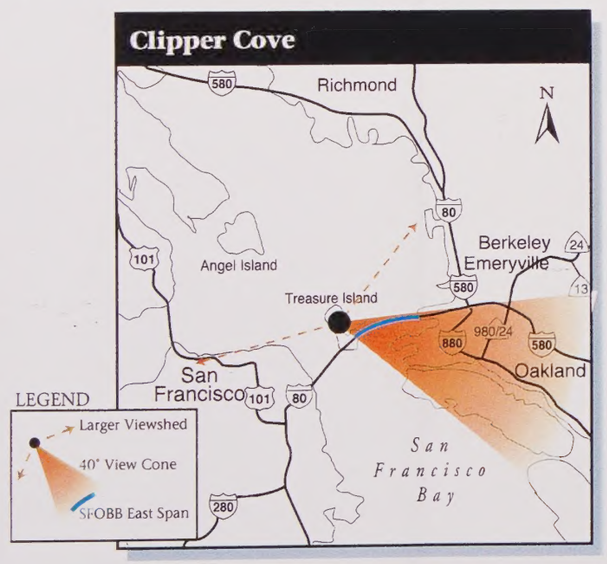


Photo Simulation View towards Nimitz House (Quarters 1), YBI
Replacement Alternative S-4 Self-Anchored Suspension Bridge Design Variation



Existing Conditions
From Clipper Cove



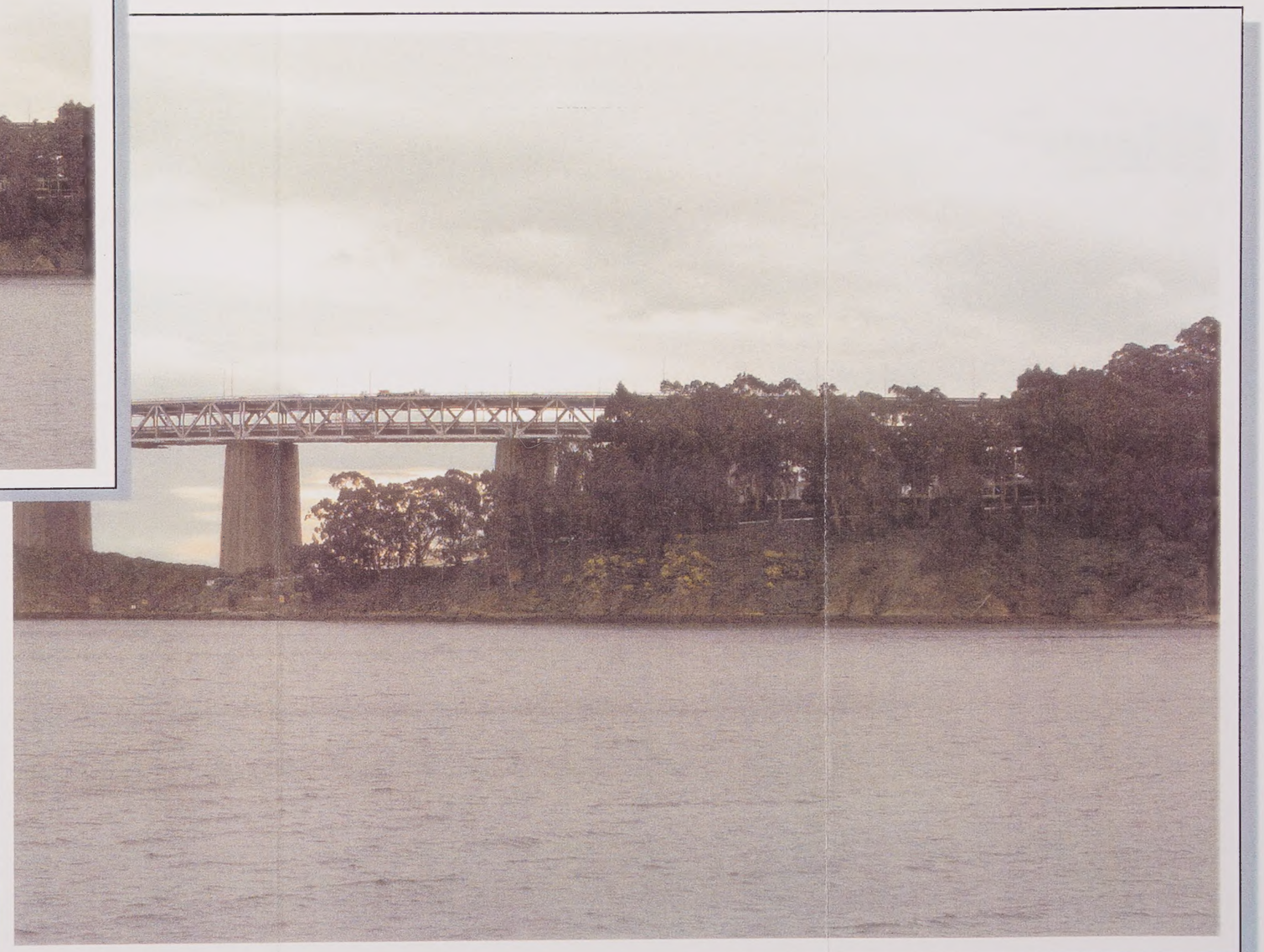
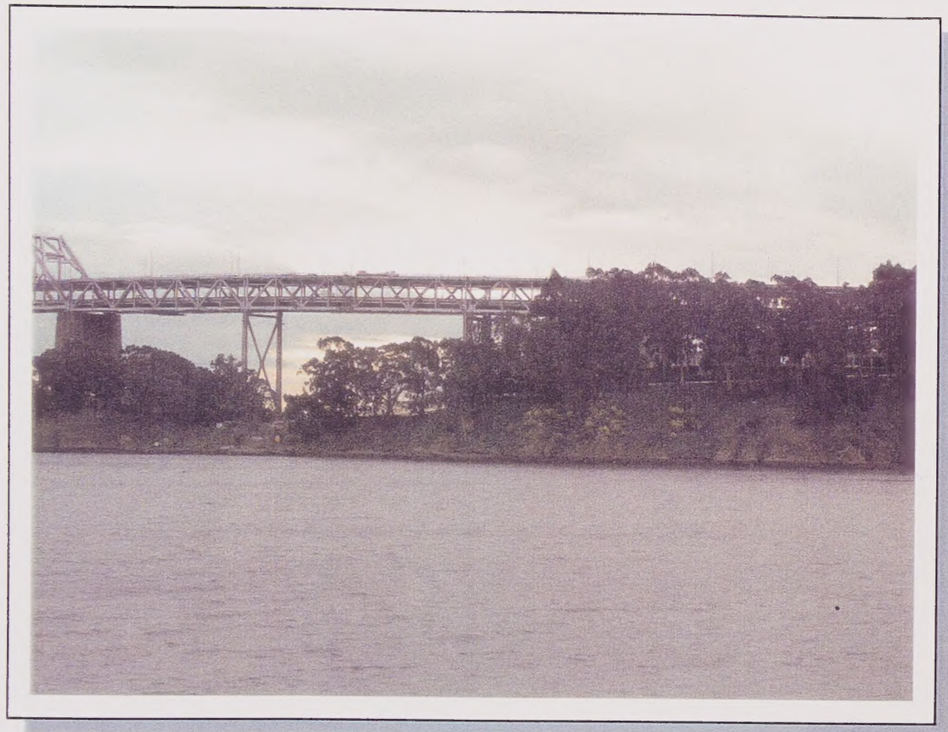


Photo Simulation View from Clipper Cove
Retrofit Alternative



Existing Conditions
From Clipper Cove

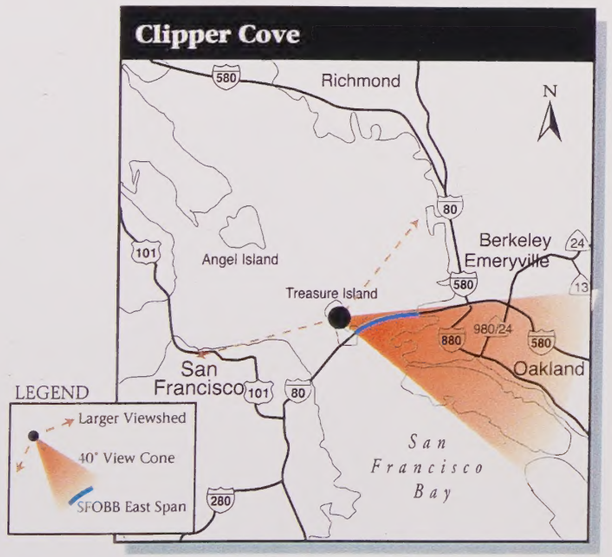
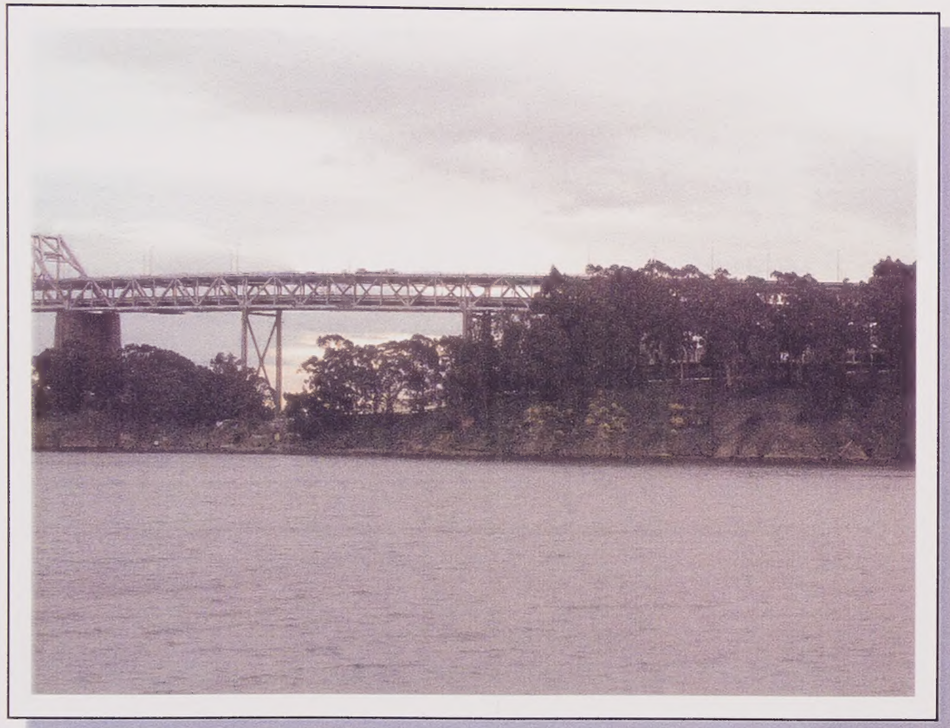


Photo Simulation View from Clipper Cove
Replacement Alternative N-6 Self-Anchored Suspension Bridge Design Variation



Existing Conditions
From Clipper Cove

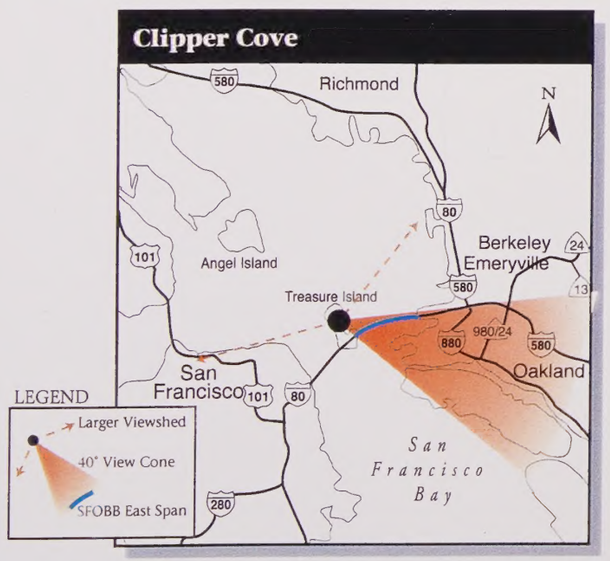
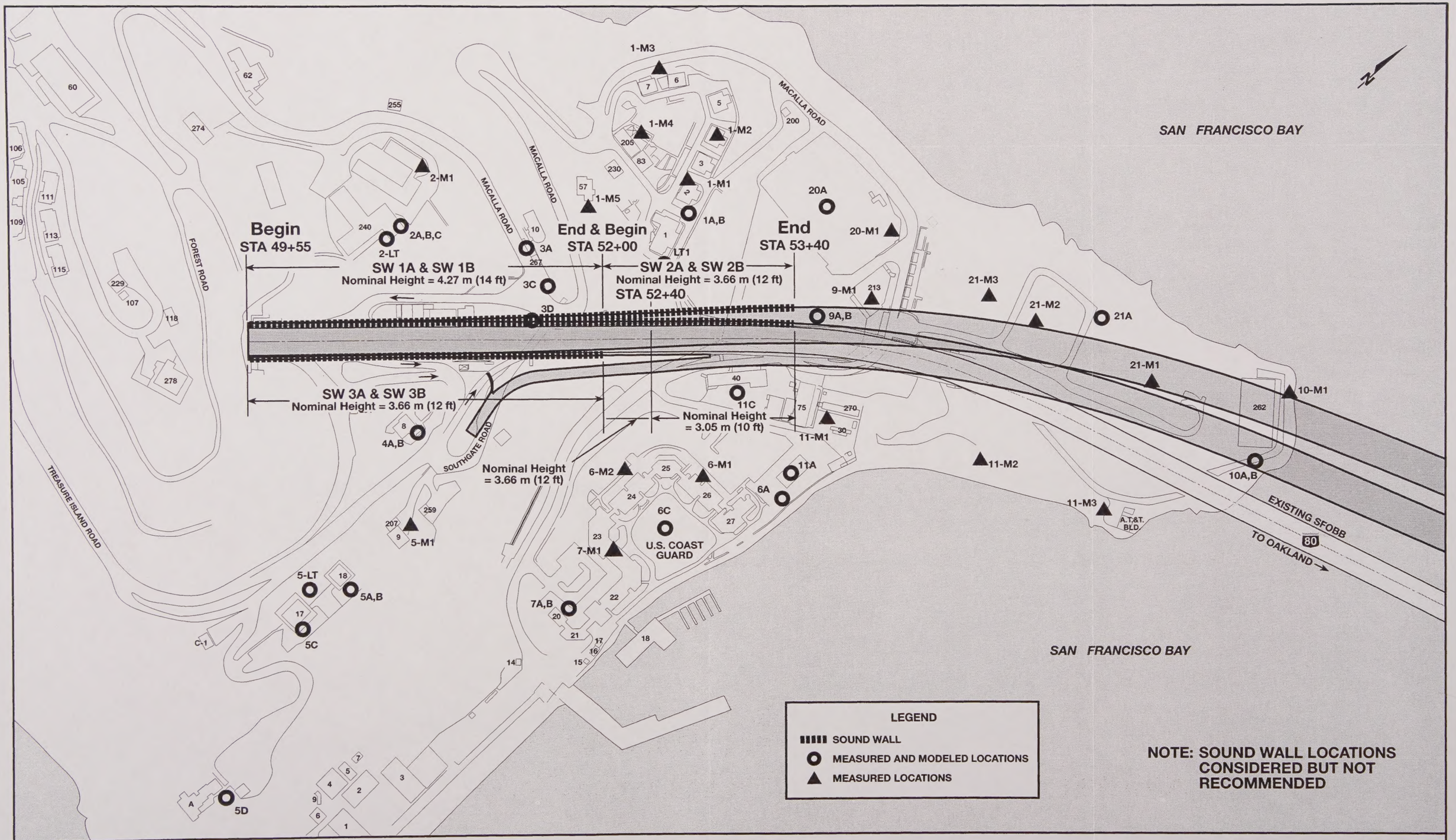


Photo Simulation View from Clipper Cove
Replacement Alternative S-4 Self-Anchored Suspension Bridge Design Variation

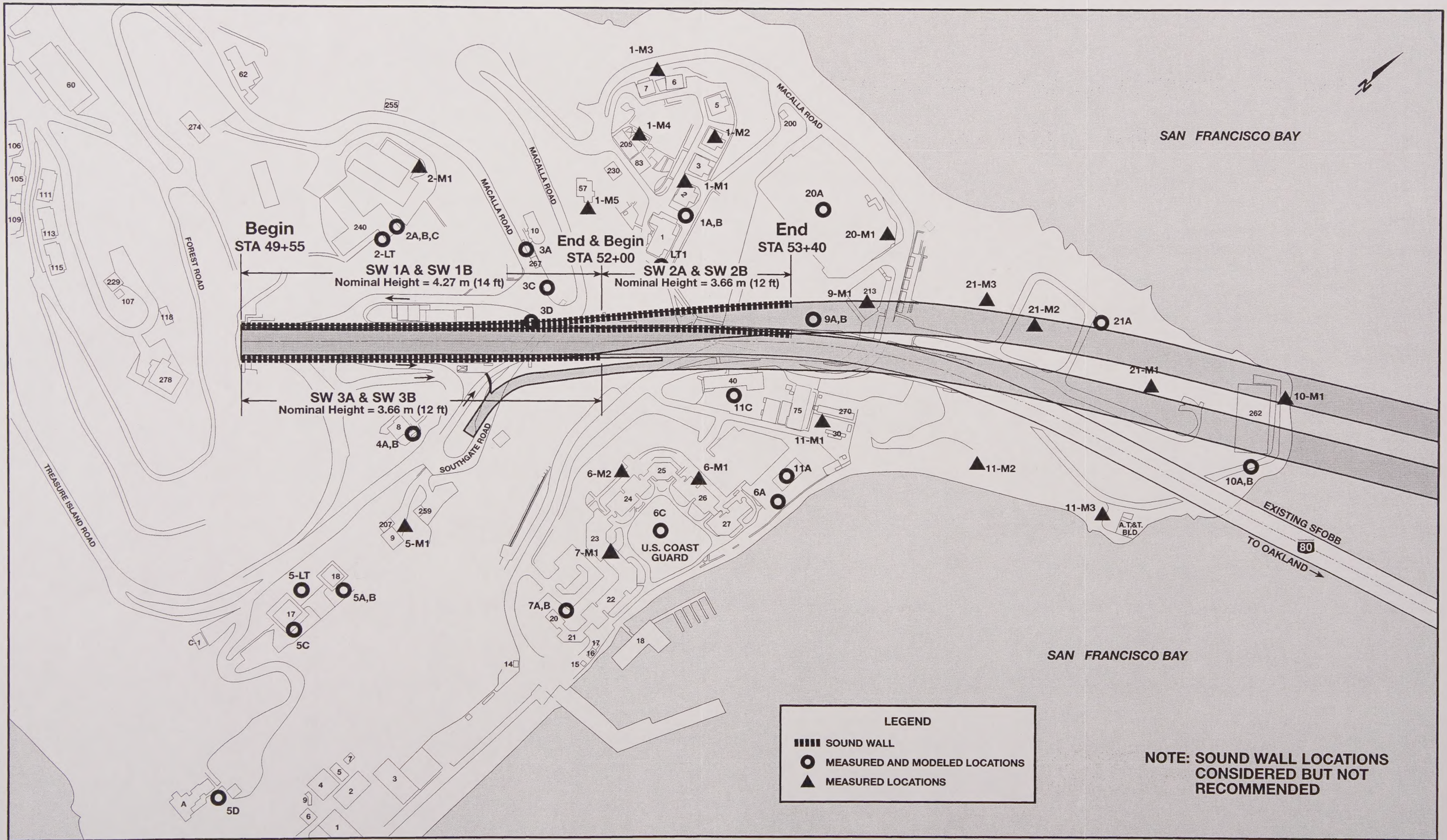


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Sound Wall Locations & Heights–
Replacement Alternative N-2–Yerba Buena Island

Figure 4-18

2/6/01

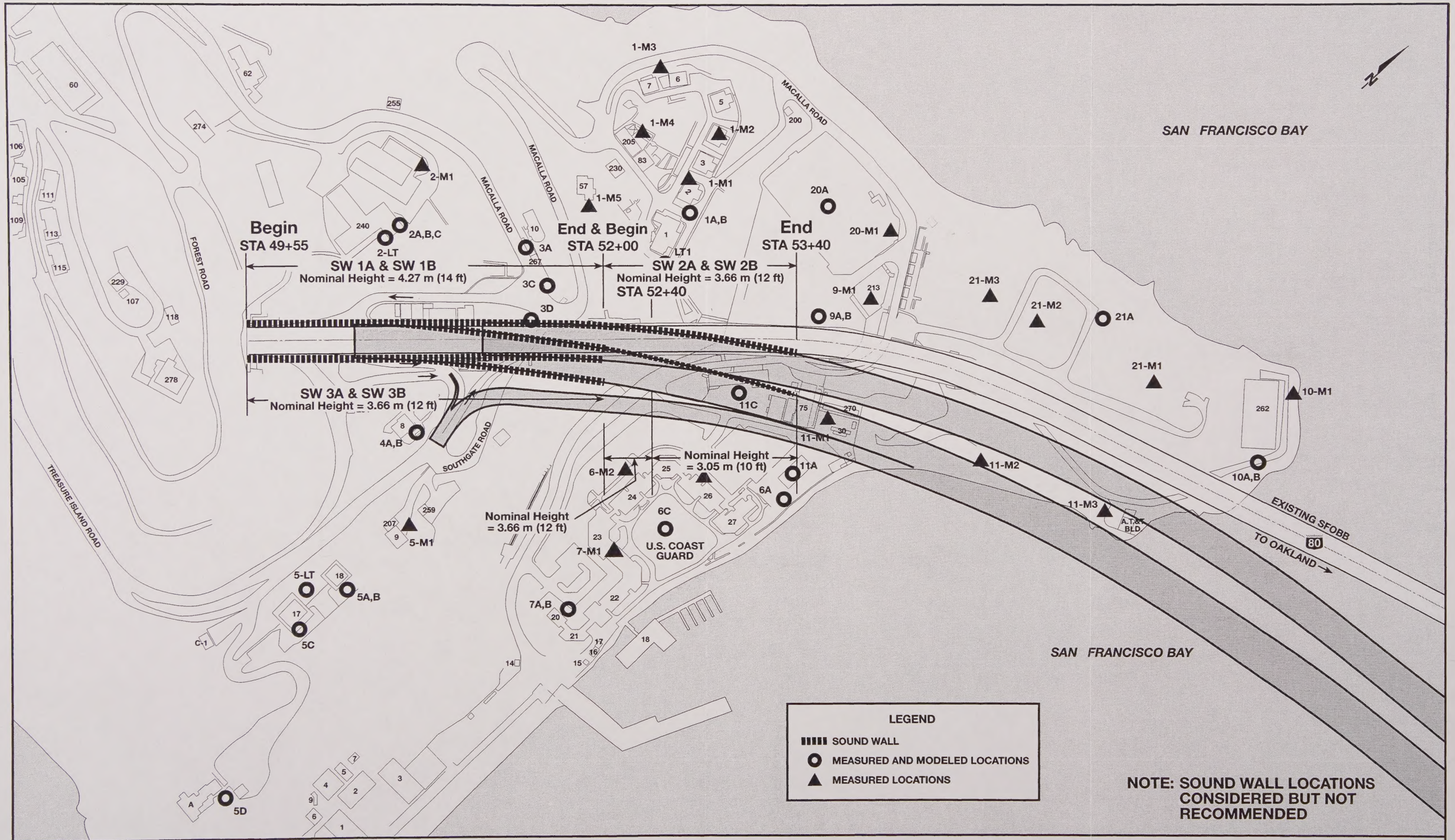


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Sound Wall Locations & Heights–
Replacement Alternative N-6–Yerba Buena Island

Figure 4-19

2/6/01

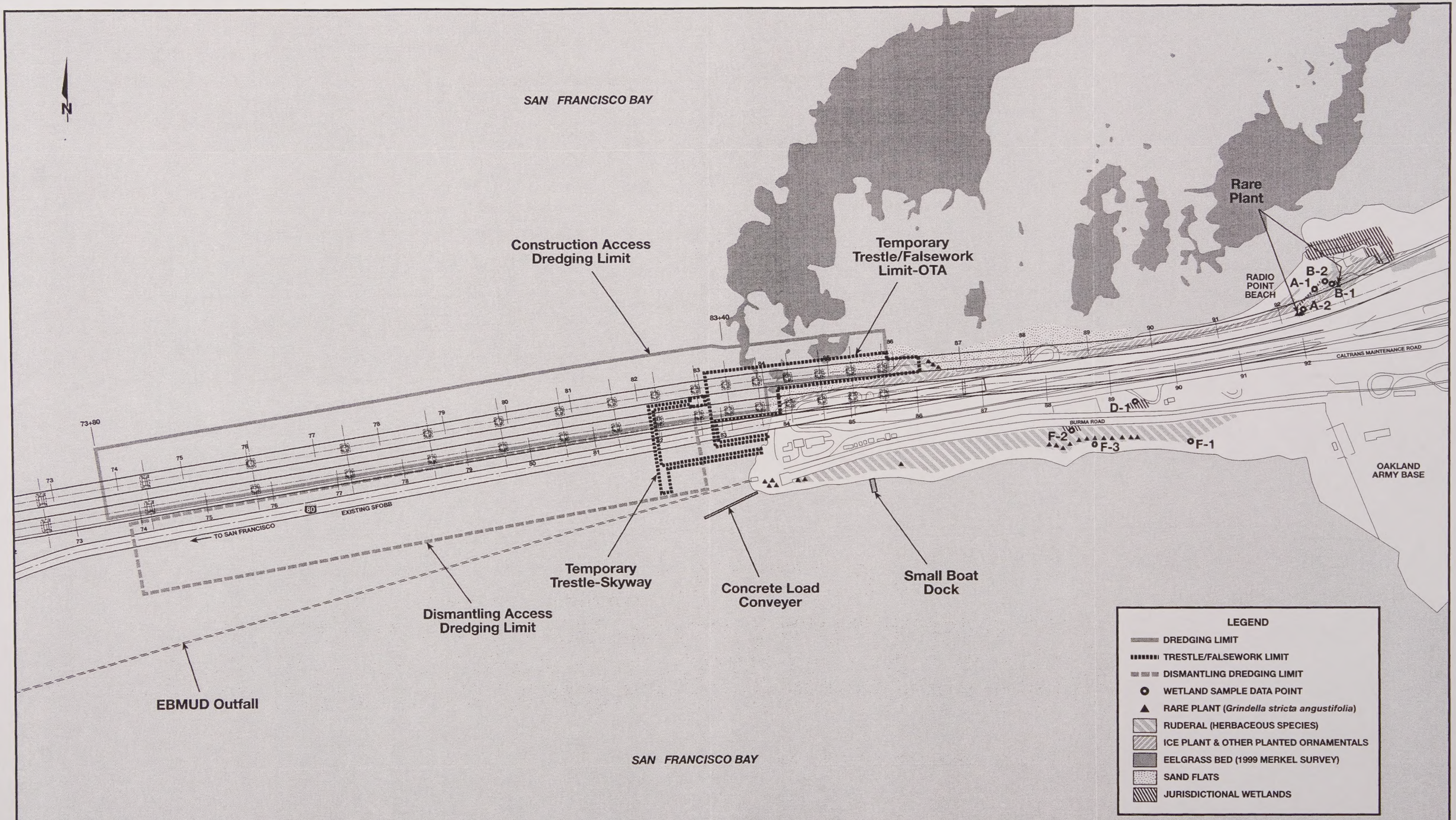


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Sound Wall Locations & Heights–
Replacement Alternative S-4–Yerba Buena Island

Figure 4-20

2/6/01



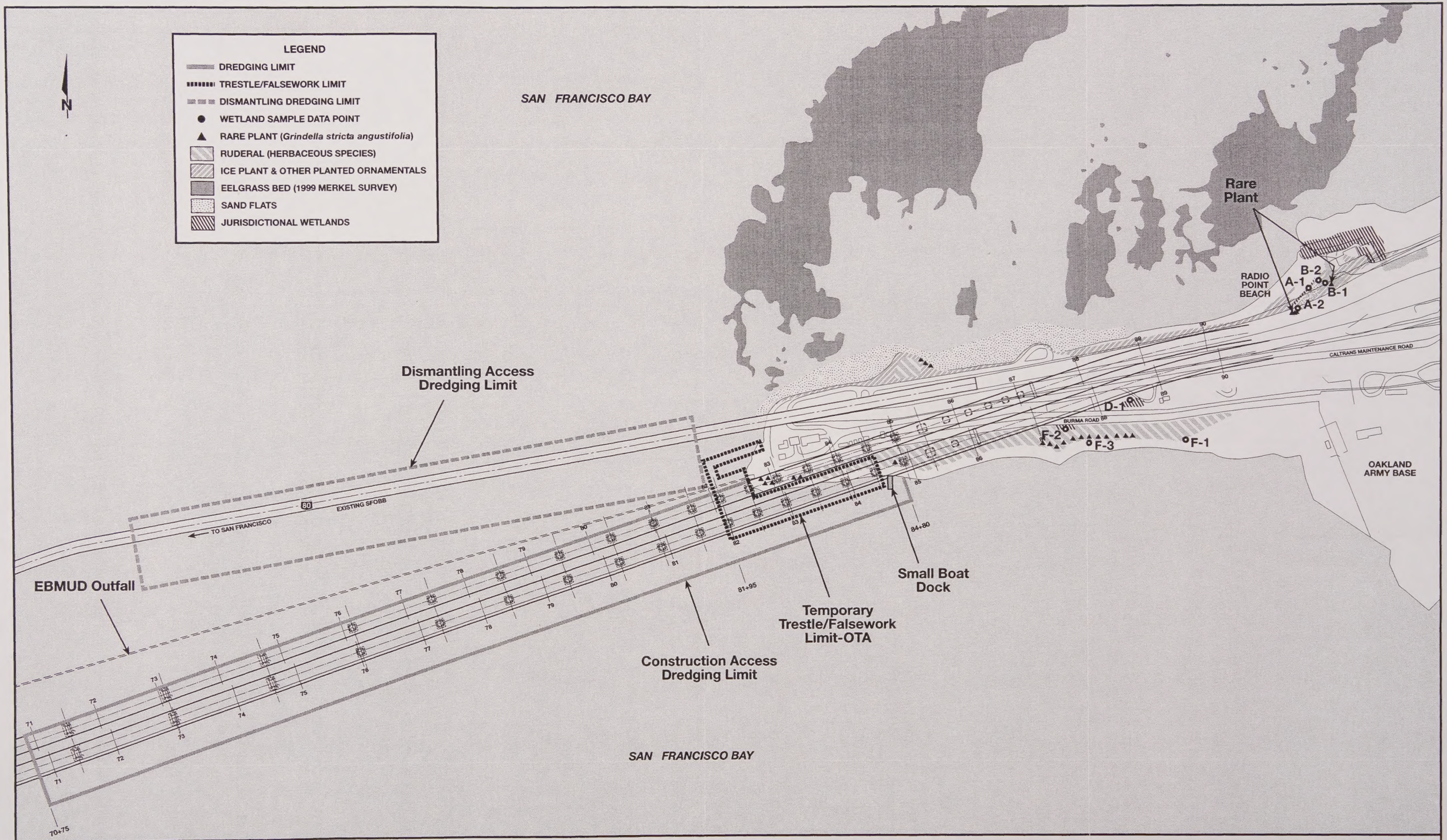
SFOBB EAST SPAN SEISMIC SAFETY PROJECT

GRAPHIC SCALE 1:6,000
0 50 100 150 m

Impacts to Natural Resources-Replacement Alternatives N-2 and N-6 at the Oakland Touchdown Area

Figure 4-21

4/25/01



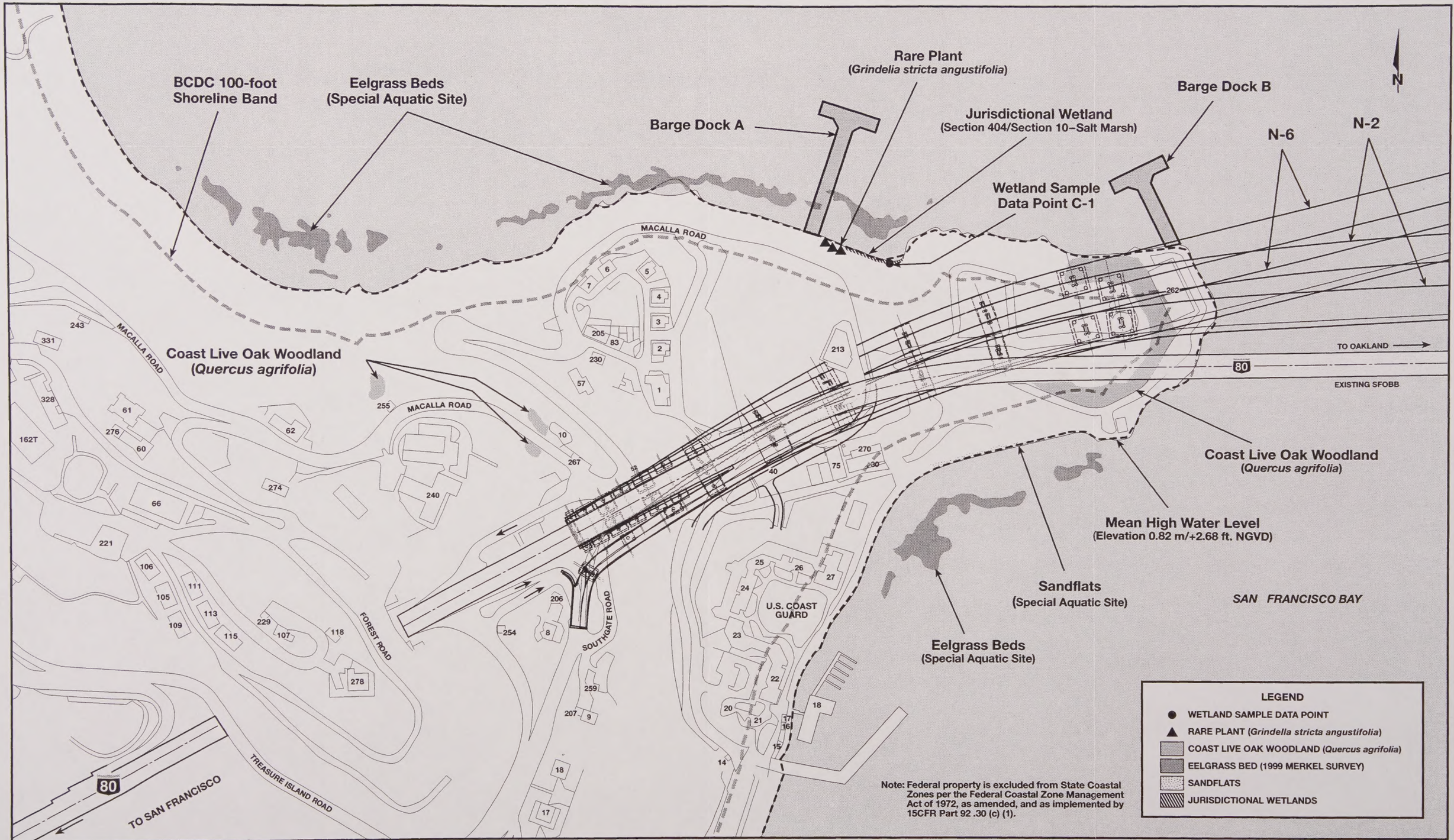
SFOBB EAST SPAN SEISMIC SAFETY PROJECT

GRAPHIC SCALE 1:6,000
0 50 100 150 m

Impacts to Natural Resources- Replacement Alternative S-4 at the Oakland Touchdown Area

Figure 4-22

4/12/01

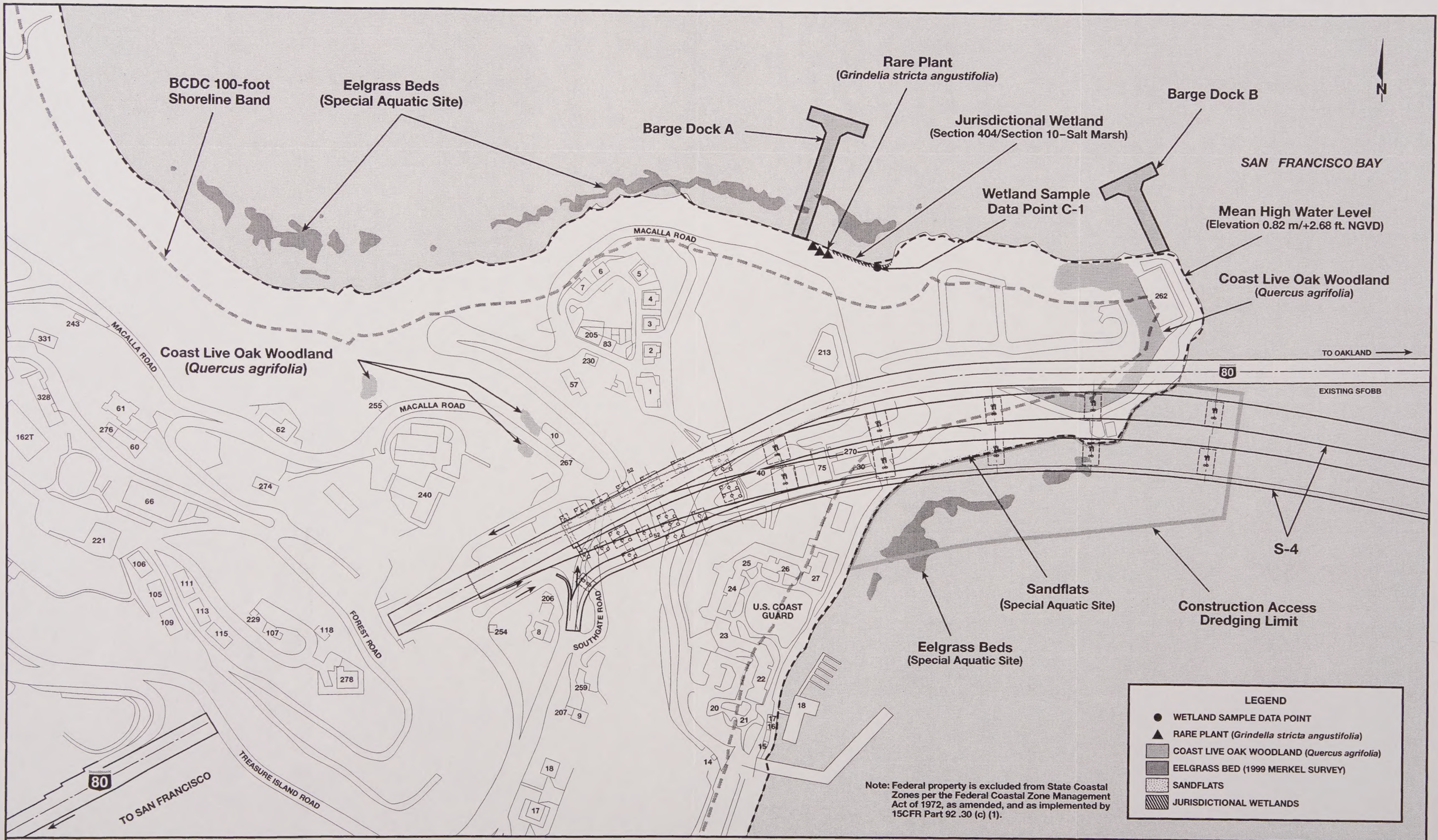


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Impacts to Natural Resources-Replacement Alternatives N-2 and N-6 at Yerba Buena Island

Figure 4-23

4/5/01

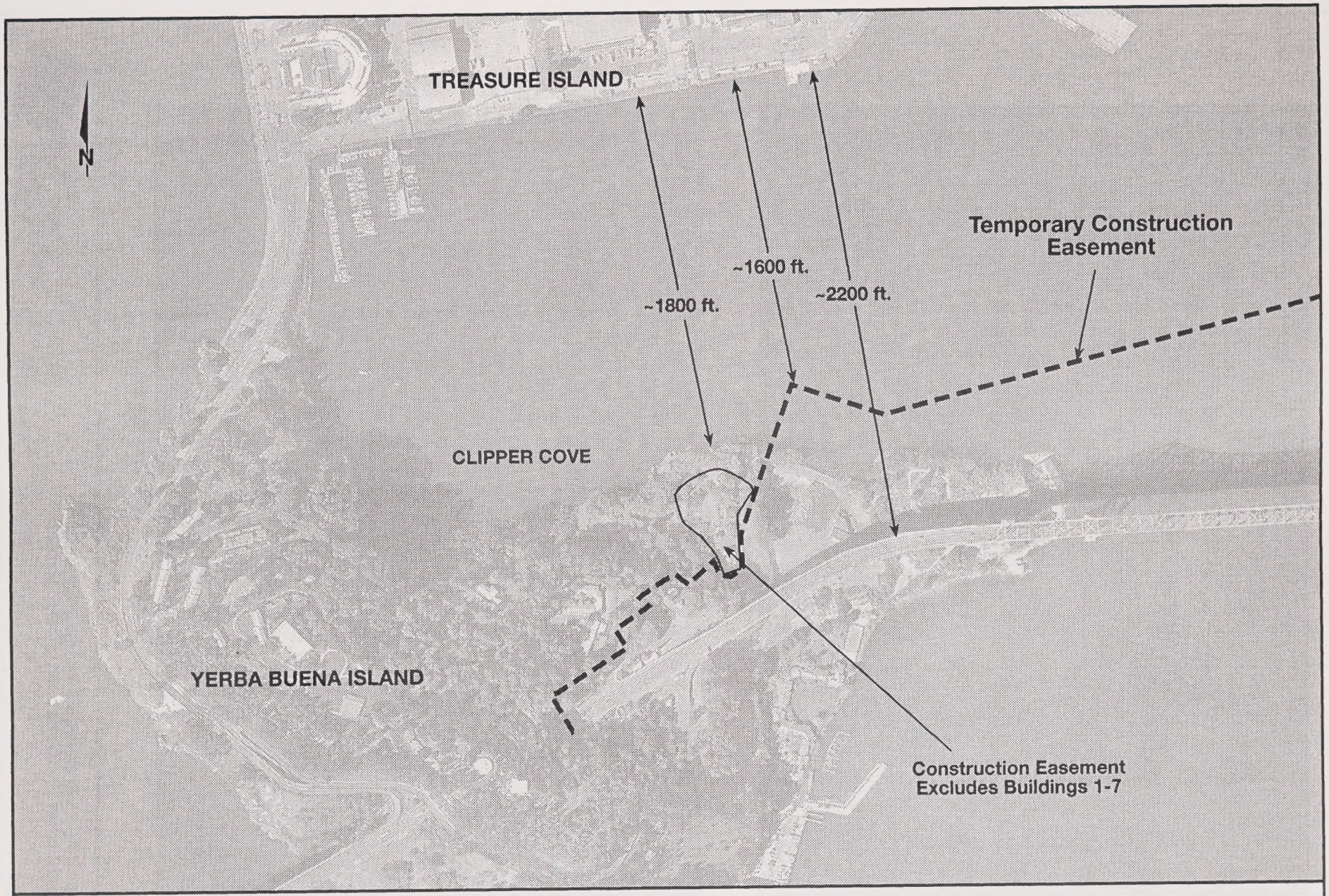


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Impacts to Natural Resources-Replacement Alternative S-4 at Yerba Buena Island

Figure 4-24

4/25/01



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

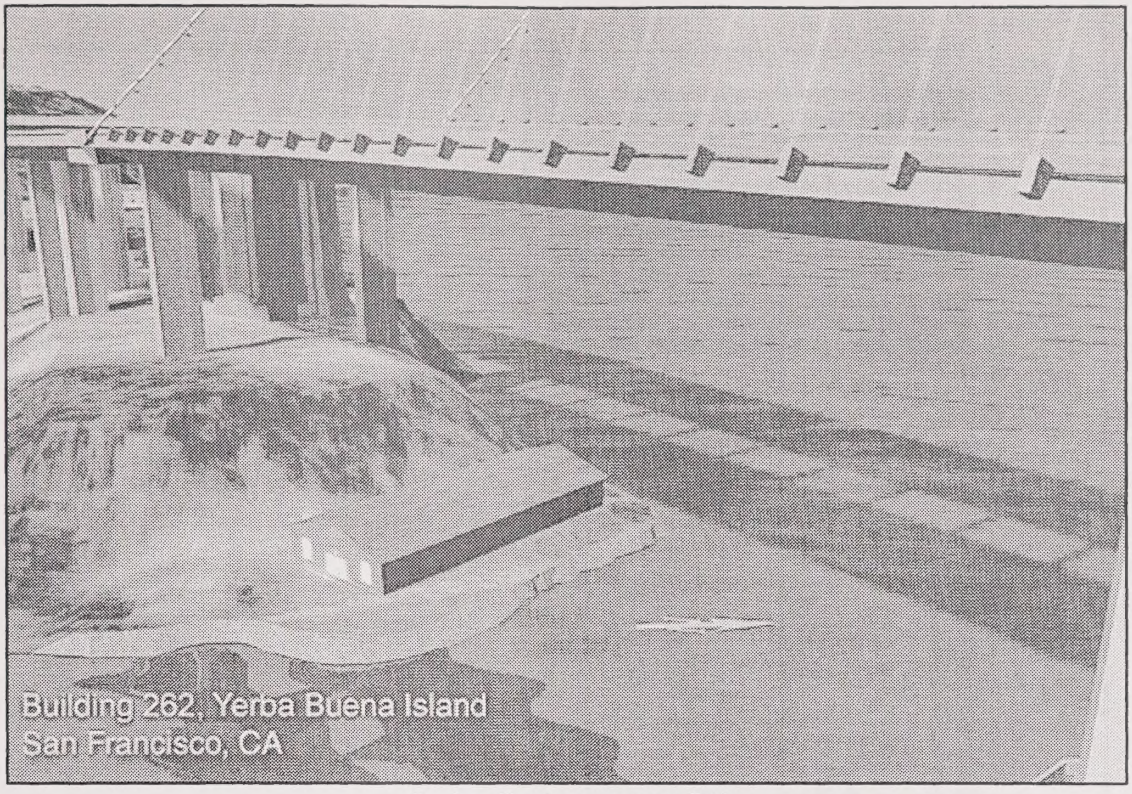
GRAPHIC SCALE 1:20,000

0 250 500 1000 m

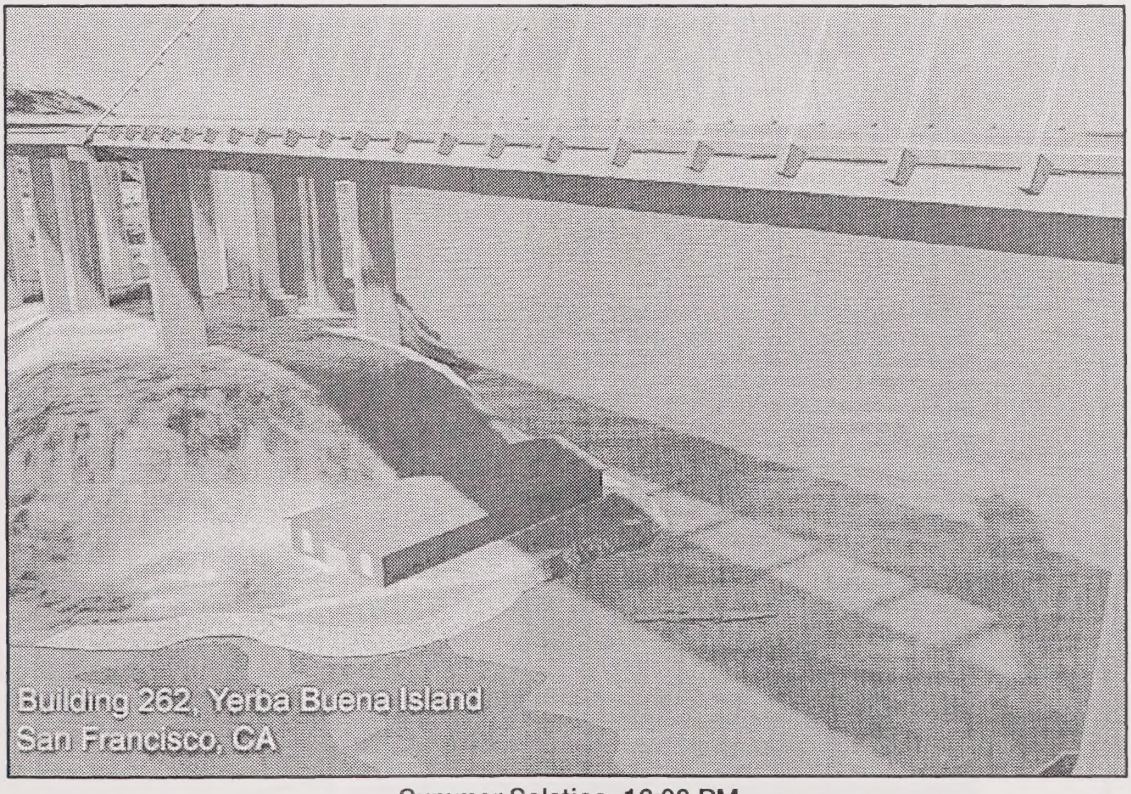
Construction Area

Figure 4-25

4/9/01



Spring Equinox, 12:00 PM

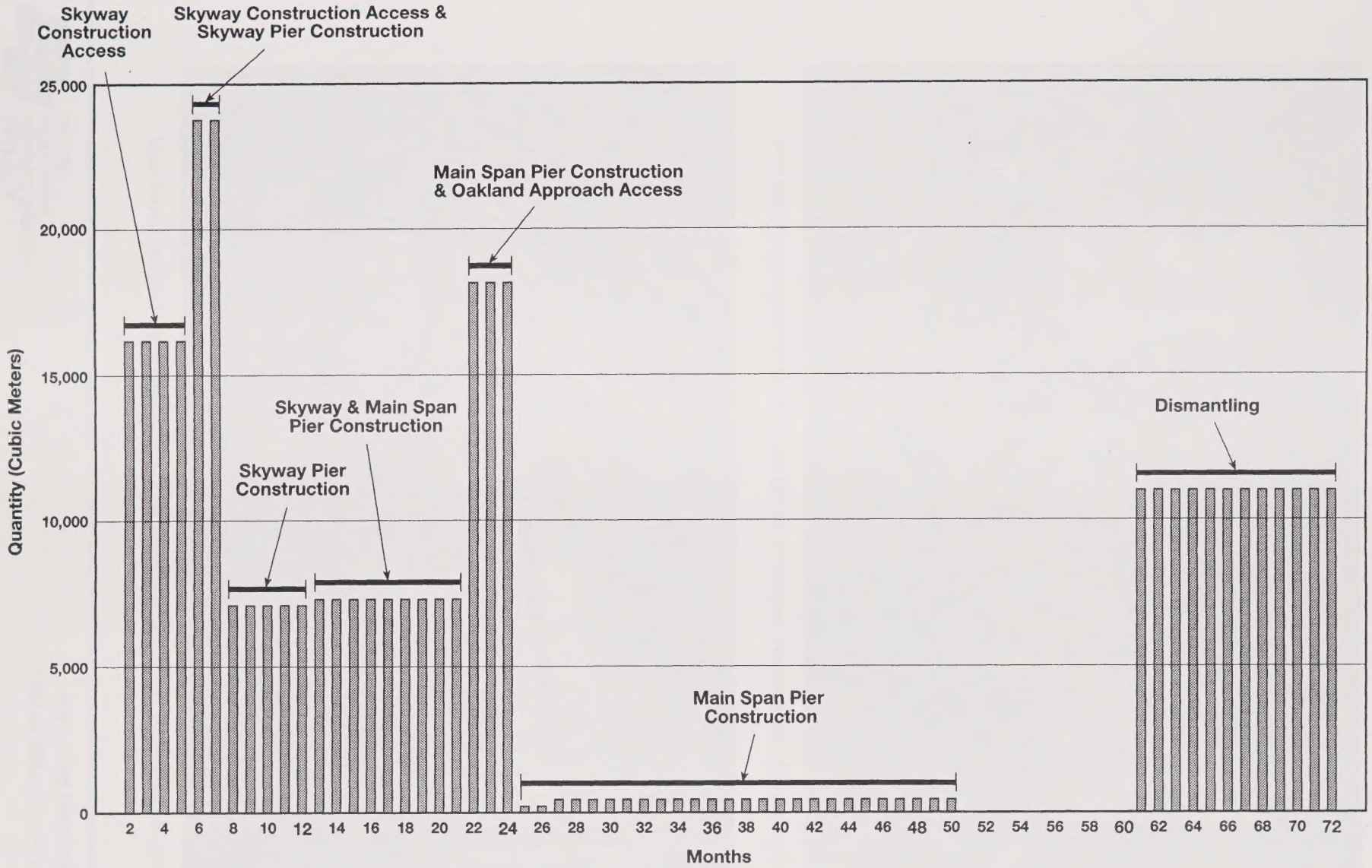


Summer Solstice, 12:00 PM

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Shadow Simulation, Replacement Alternative N-6
Building 262 (Torpedo Building), Yerba Buena Island

Figure 4-26

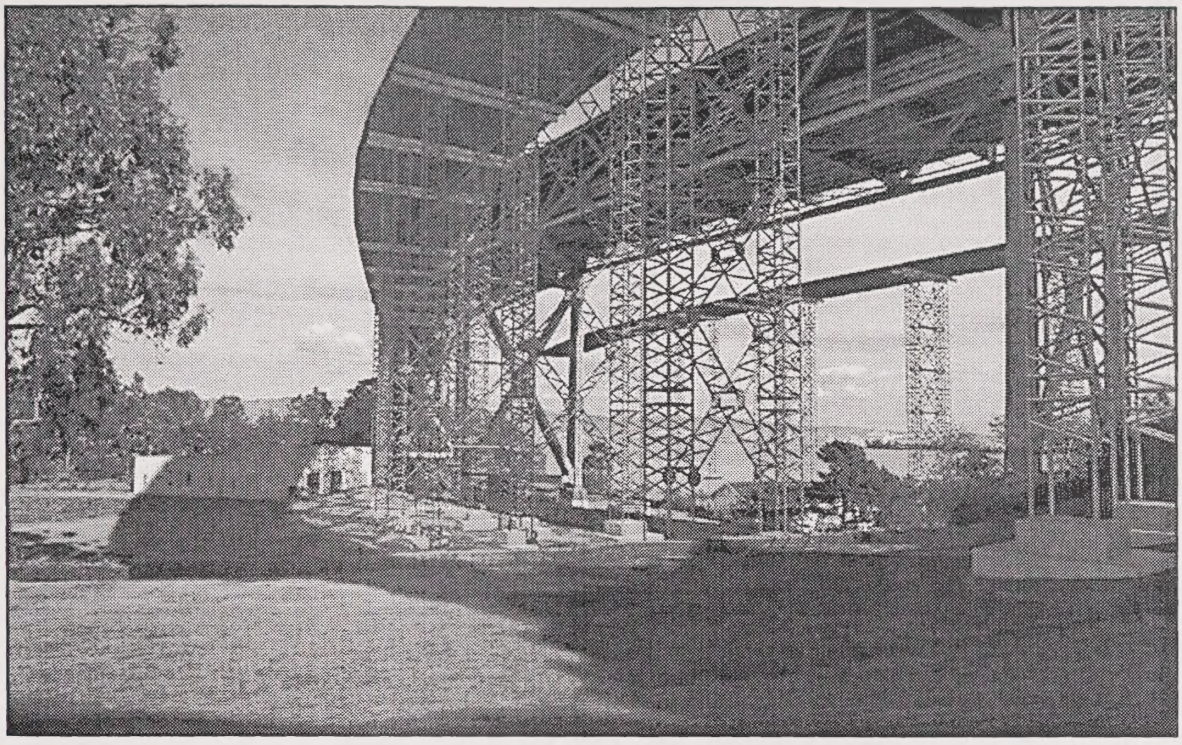


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

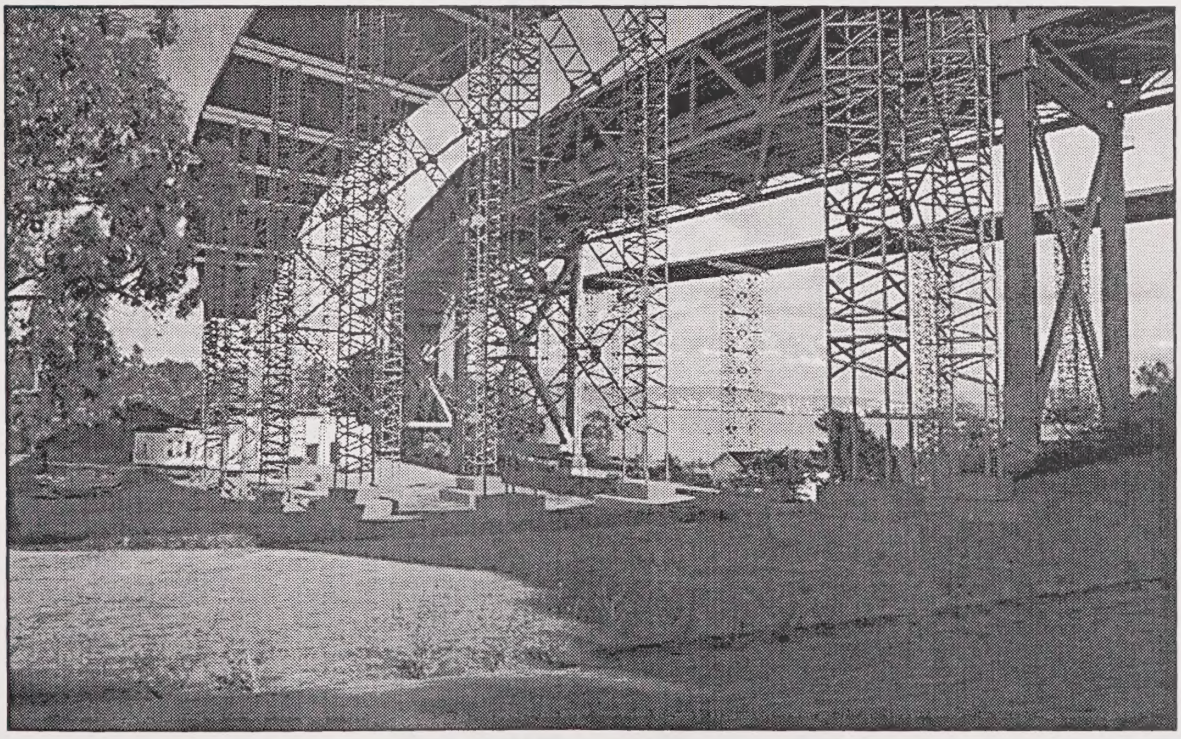
Anticipated Monthly Dredging Volumes–
Construction and Dismantling of East Span

Figure 4-27

3/10/01



View from Nimitz House of North-South Detour Structures–Replacement Alternative S-4



View Nimitz House of North-South Detour Structures–Replacement Alternatives N-2/N-6

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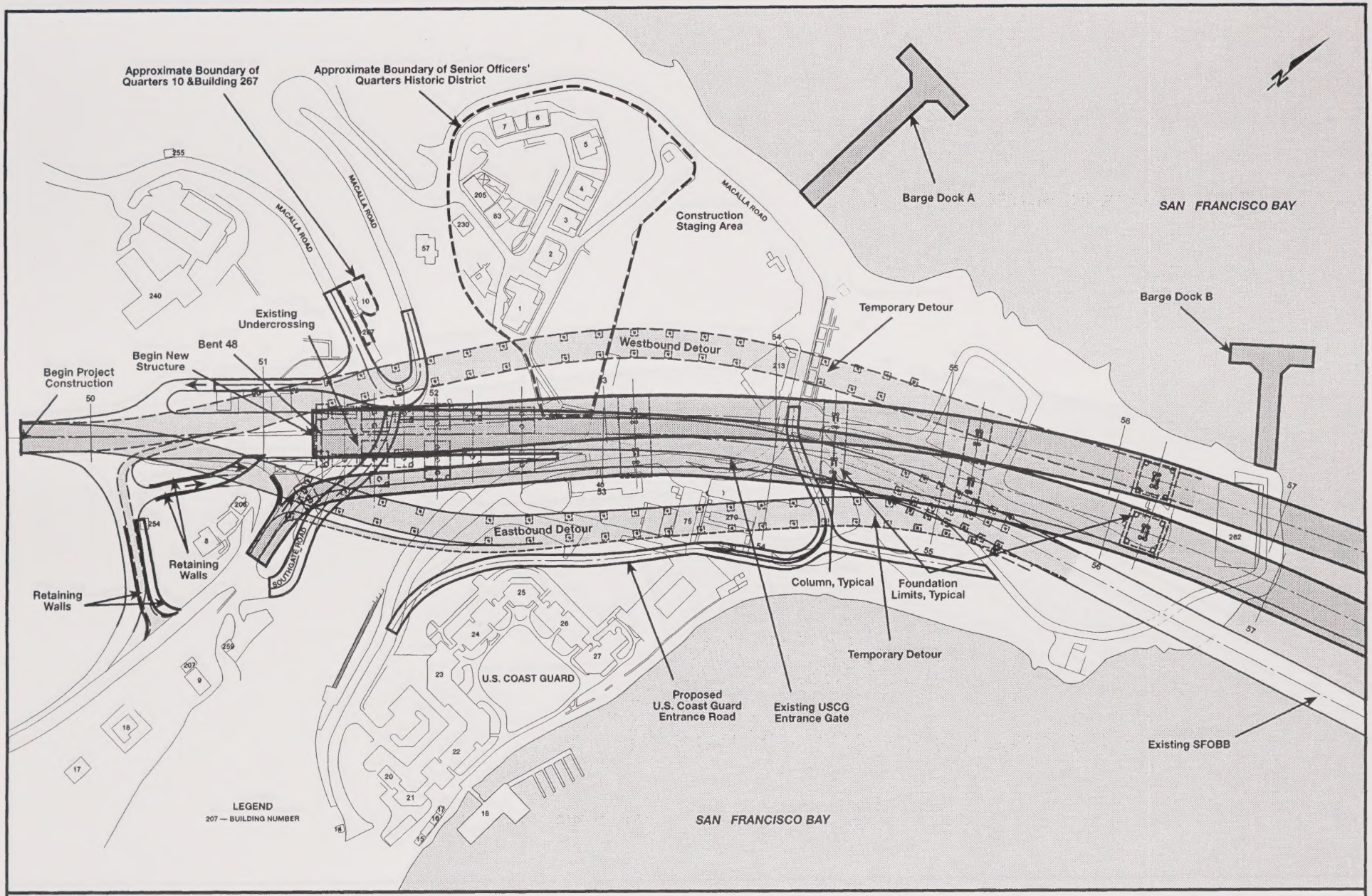
SEISMIC SAFETY
PROJECT

Simulated Views of the North-South
Detour Structures–Yerba Buena Island

Figure 4-28

3/10/01



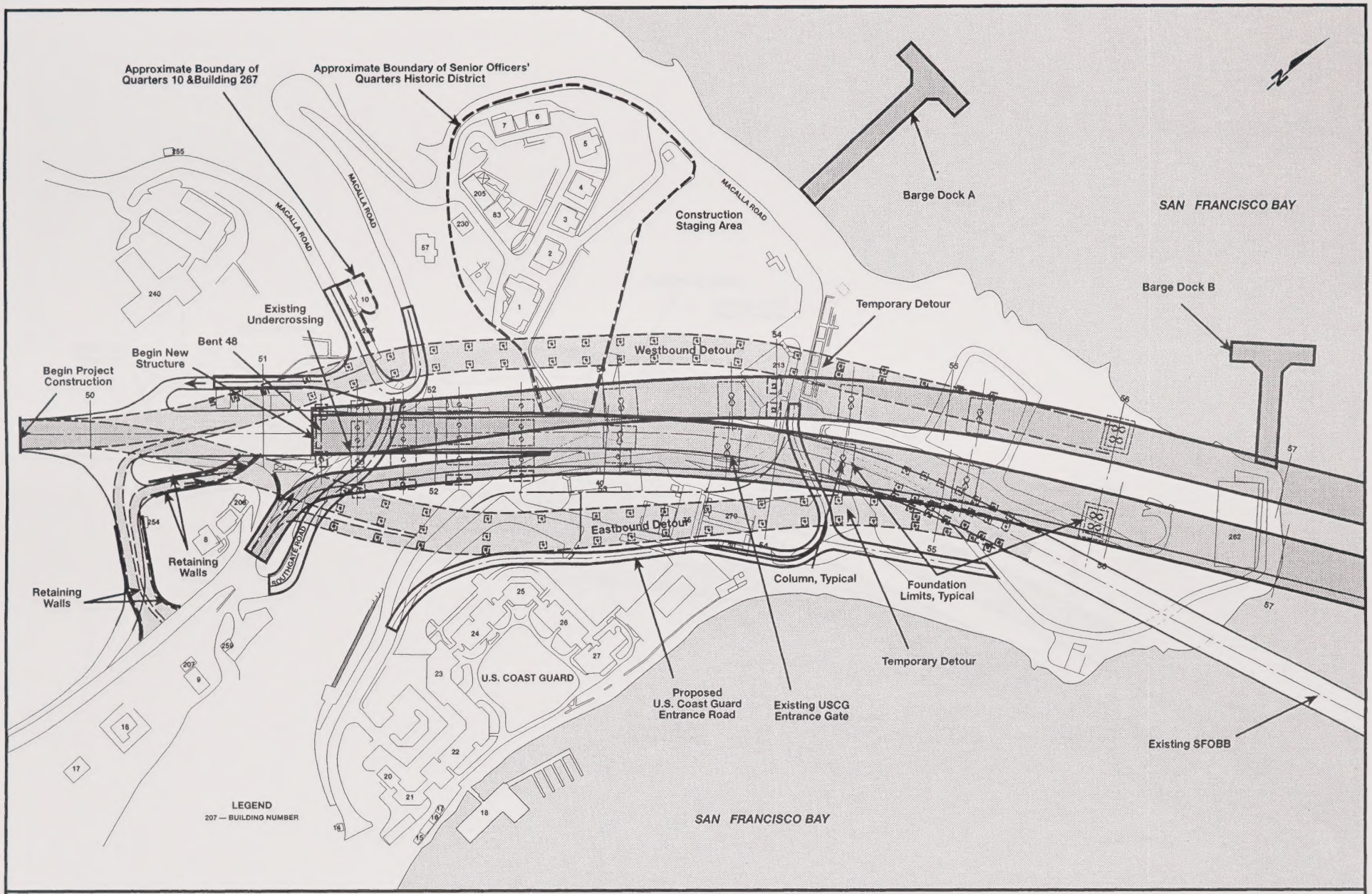
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:3,000
0 25 50 100 m

Foundation Construction Impact

Temporary Detours: North-South Option Replacement Alternative N-2

Figure 6-1



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

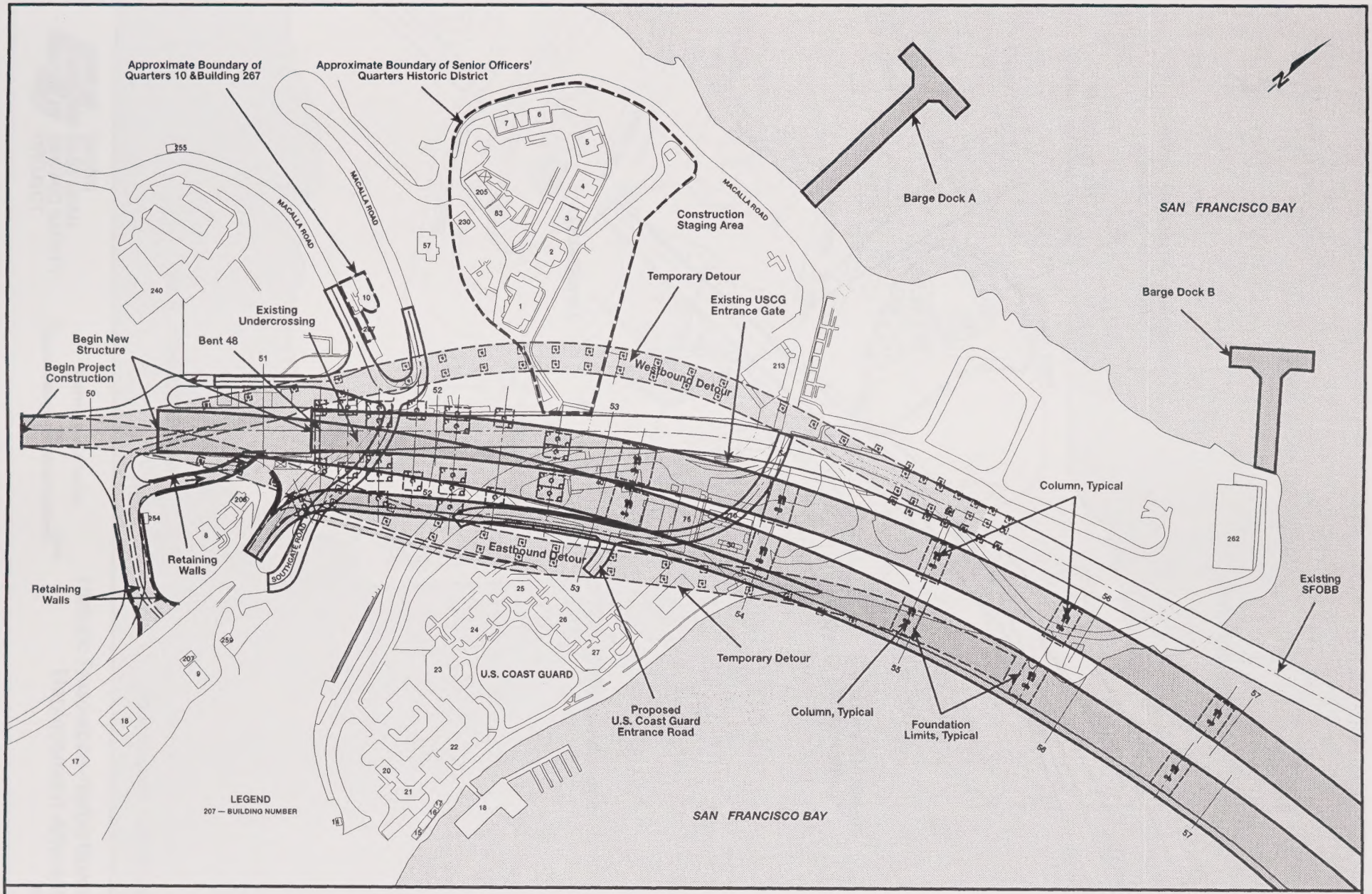
GRAPHIC SCALE 1:3,000
0 25 50 100 m

Foundation Construction Impact

Temporary Detours: North-South Option Replacement Alternative N-6

Figure 6-2

4/5/01



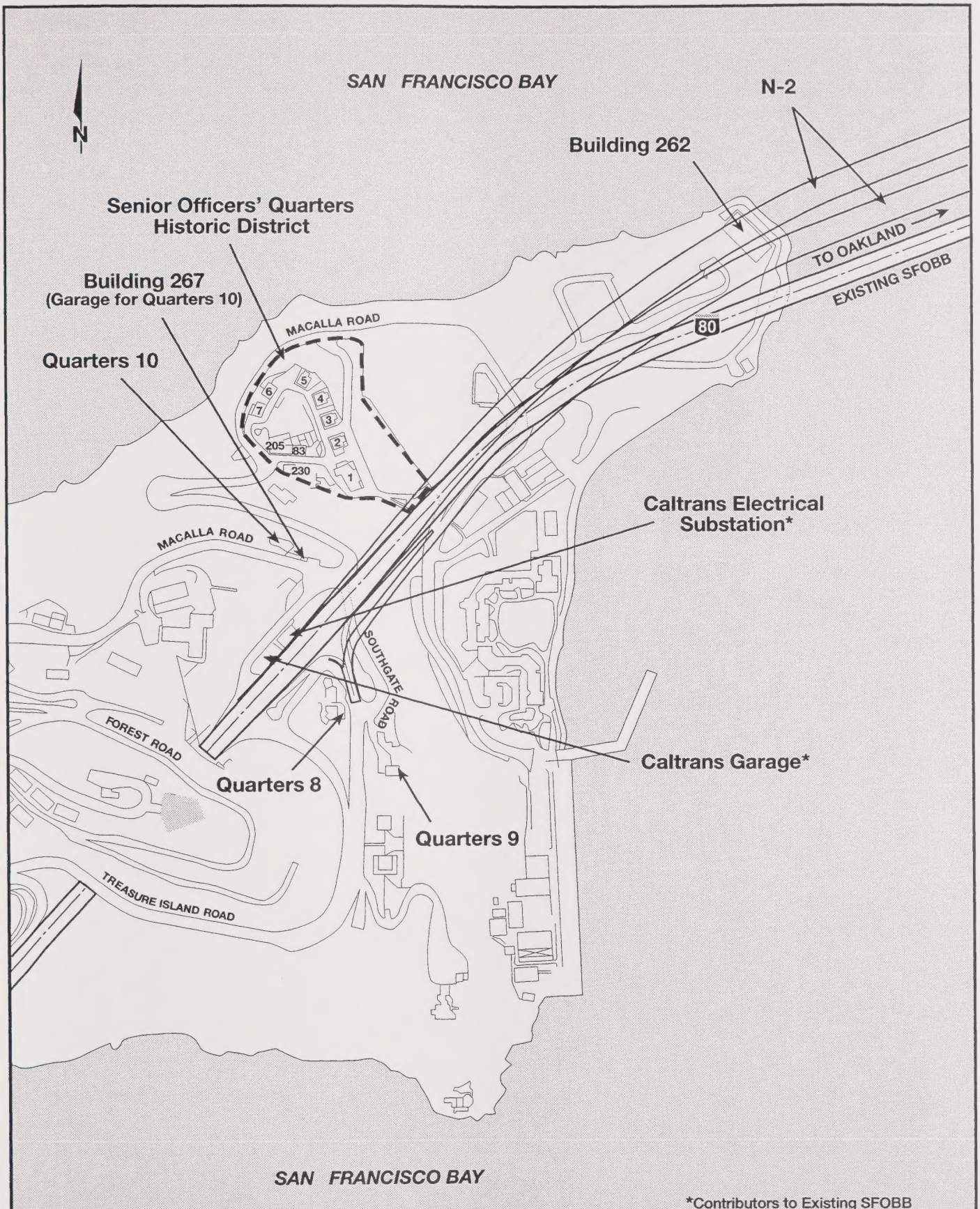
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:3,000
0 25 50 100 m

Foundation Construction Impact
Temporary Detours: North-South Option Replacement Alternative S-4

Figure 6-3

4/12/01

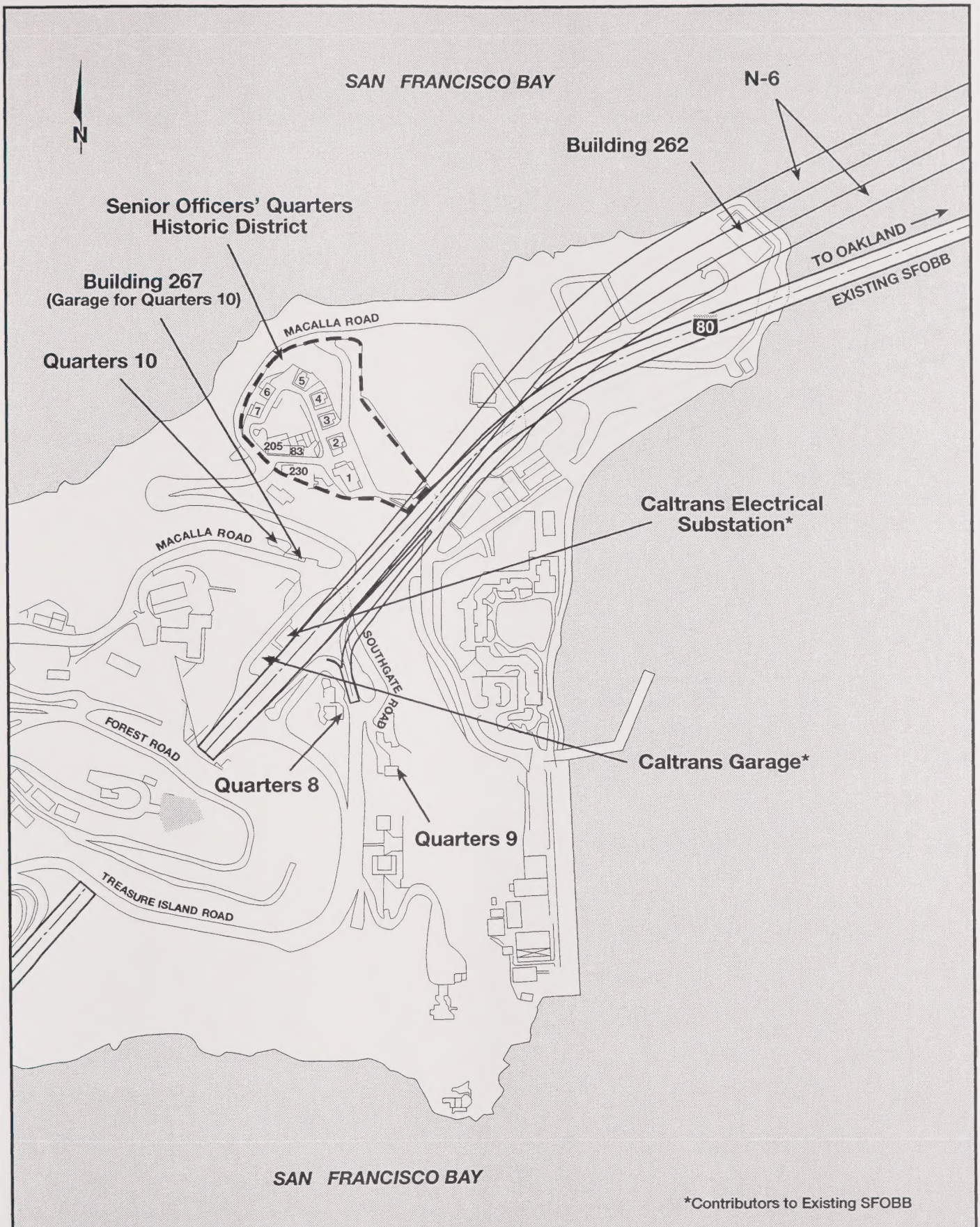


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:5,000
0 100 200m

Historic Resources–Yerba Buena Island
Replacement Alternative N-2
Figure 6-4

3/10/01



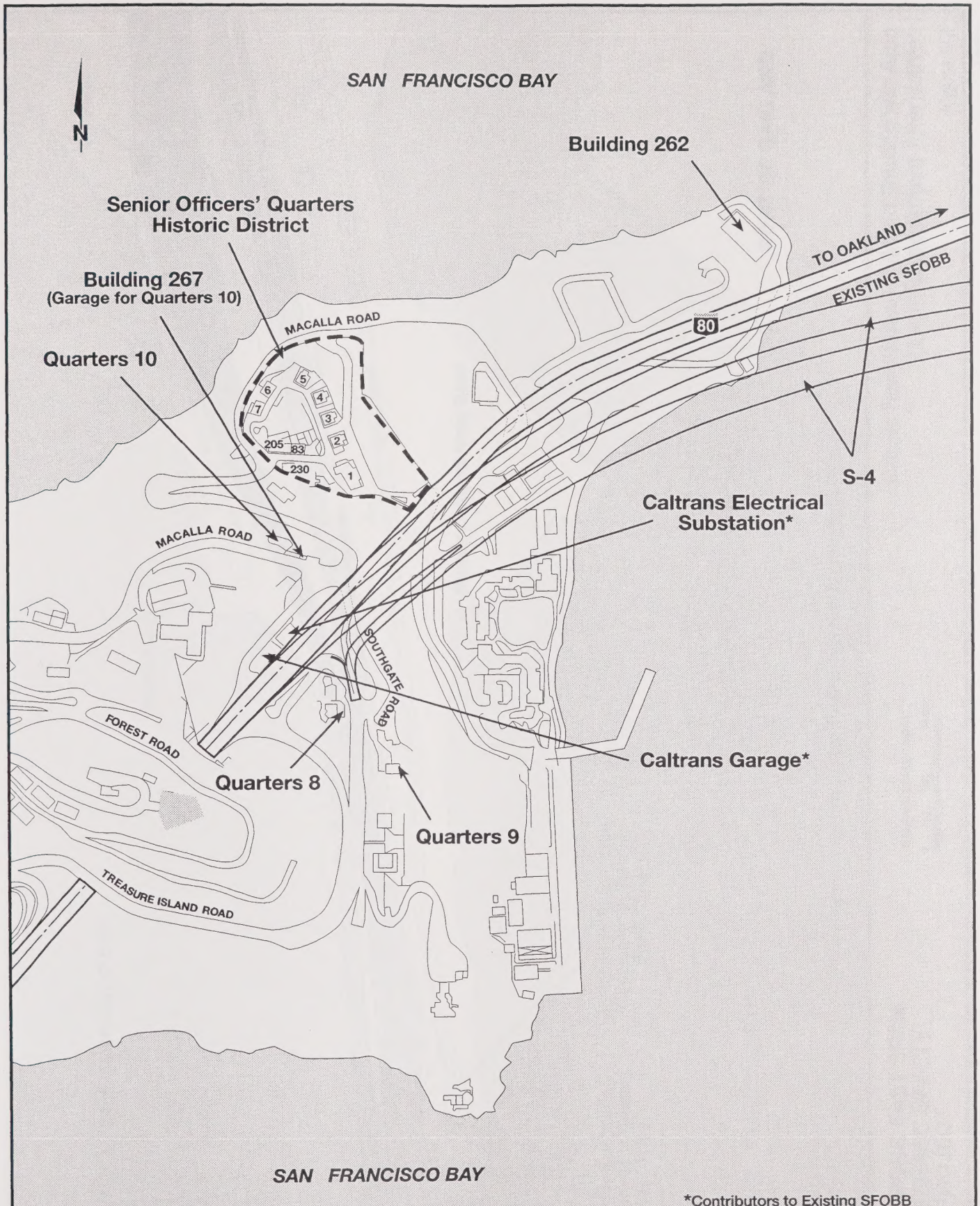
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:5,000

0 100 200m

Historic Resources–Yerba Buena Island
Replacement Alternative N-6
Figure 6-5

3/10/01



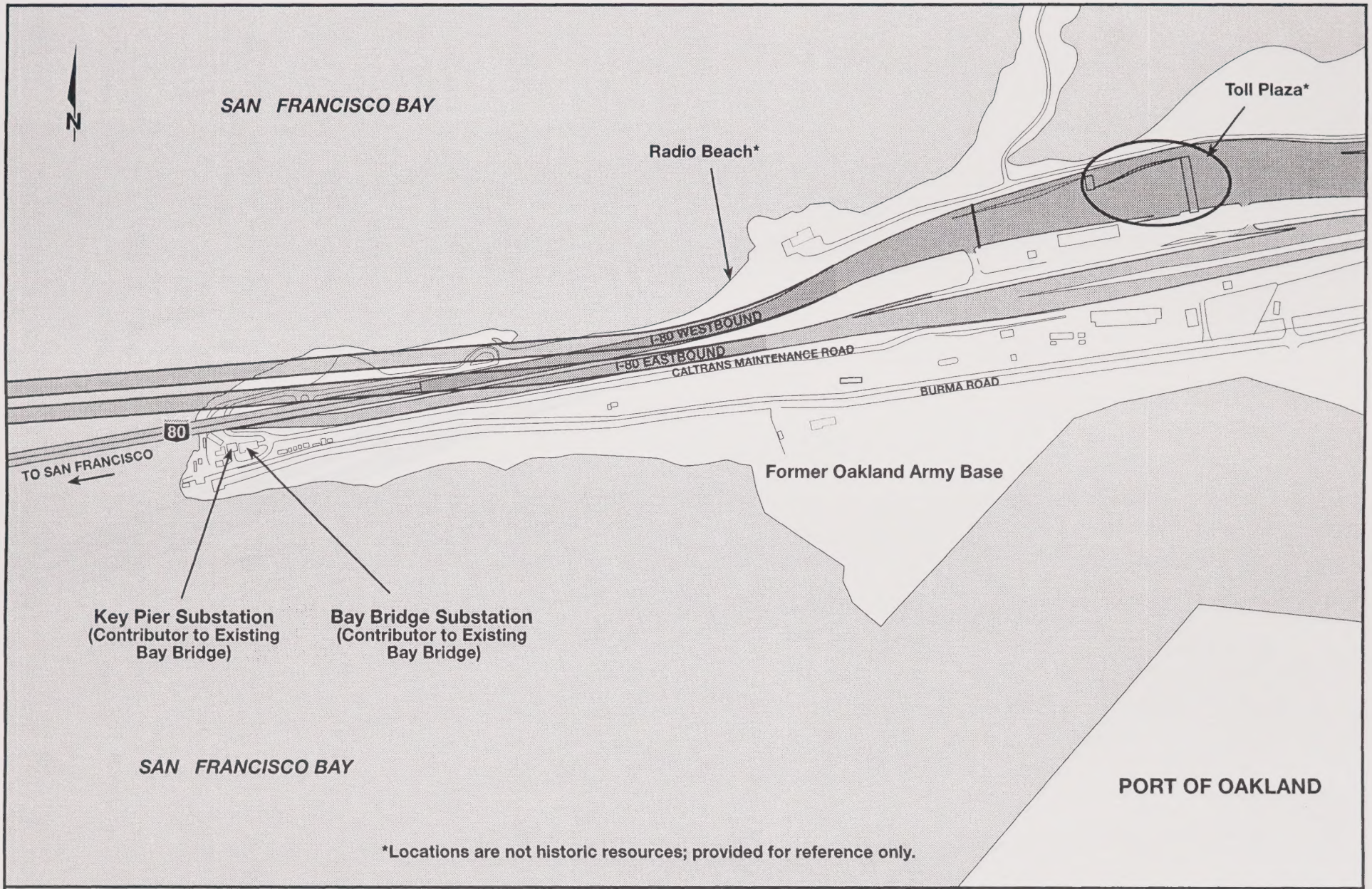
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:5,000

0 100 200m

Historic Resources–Yerba Buena Island
Replacement Alternative S-4
Figure 6-6

3/10/01



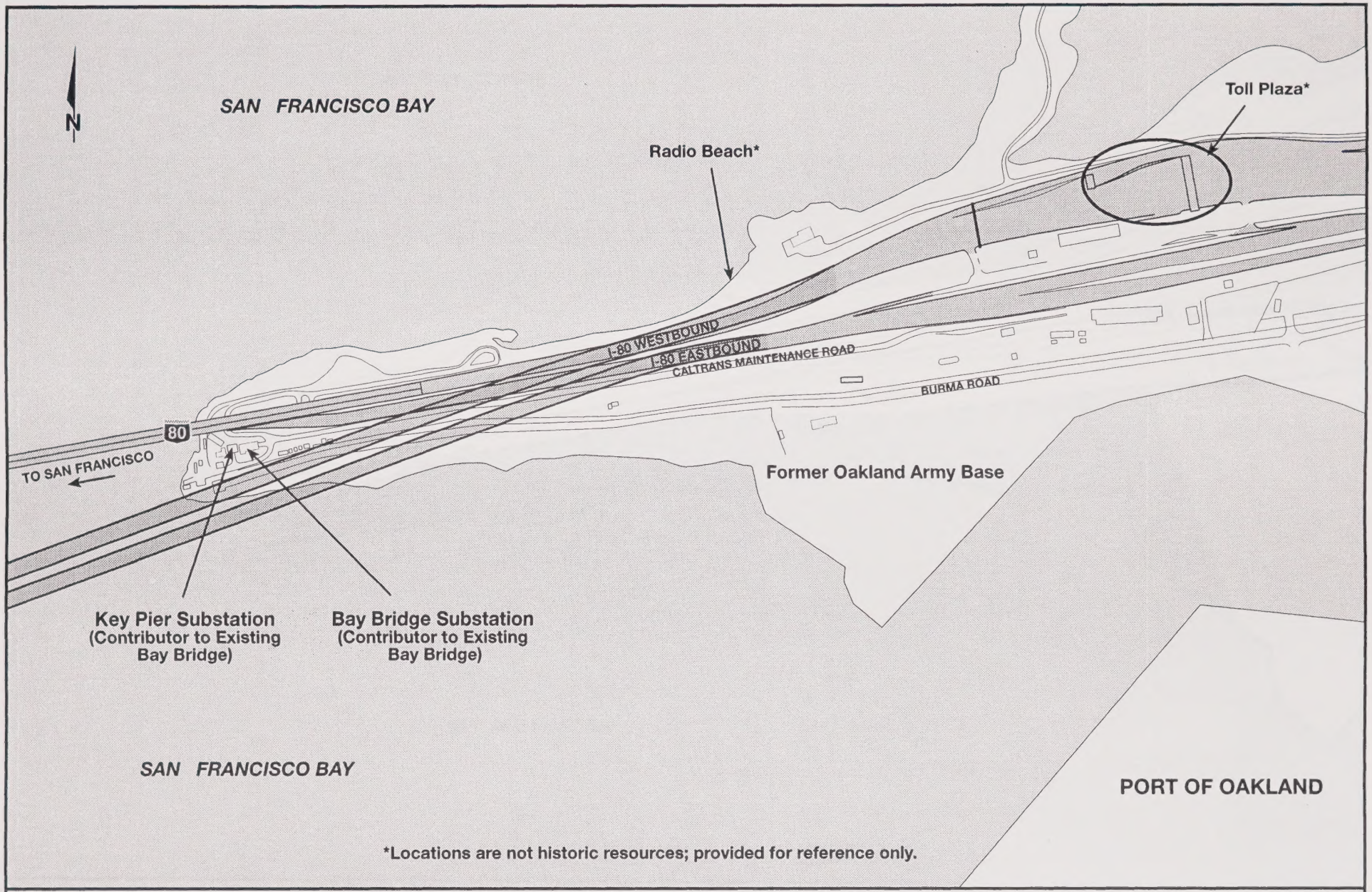
SFOBB EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:8,000
0 50 100 200 m

Historic Resources–Oakland Touchdown Area
North Replacement Alternatives

Figure 6-7

4/12/01



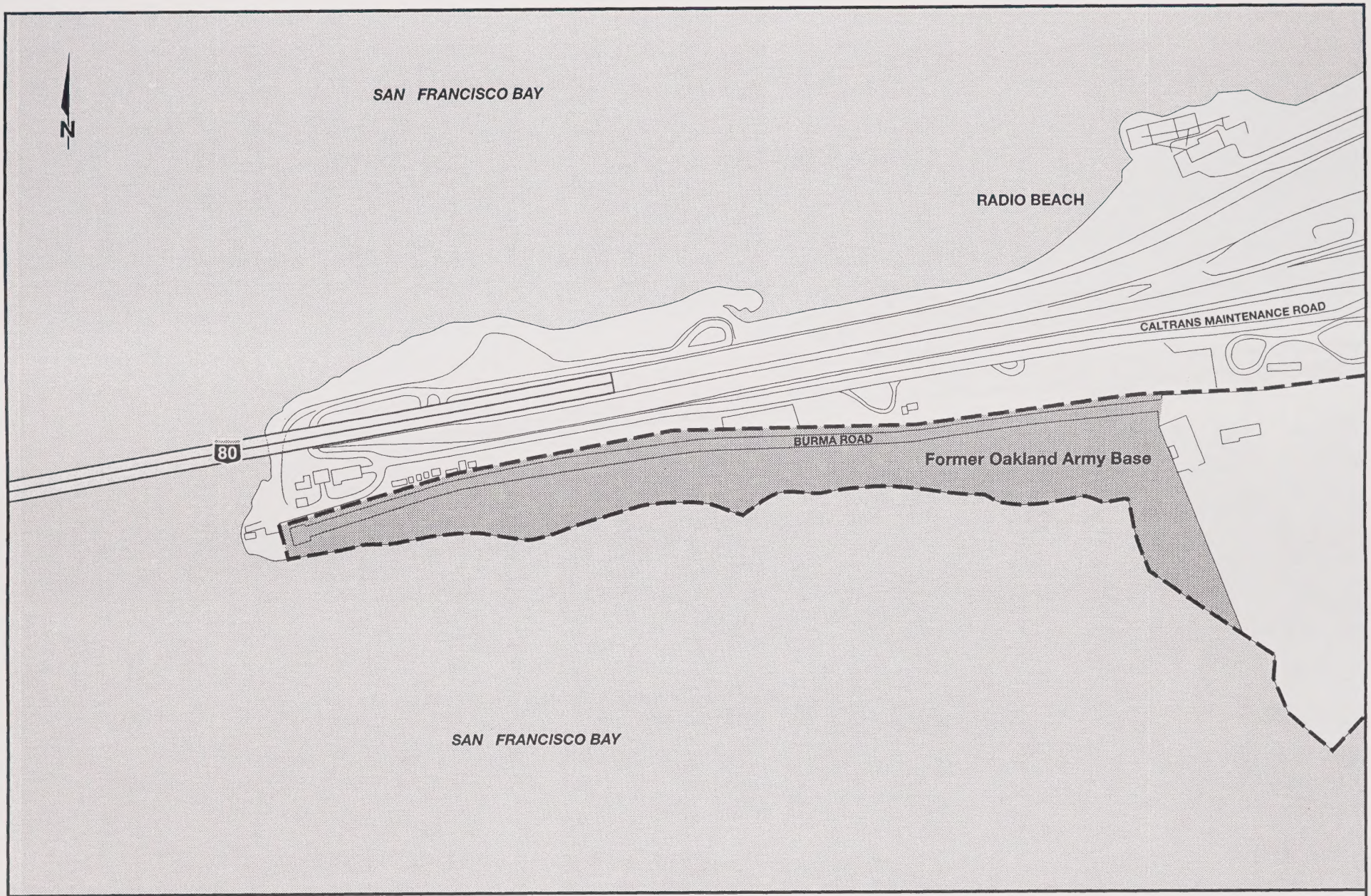
SFOBB EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:8,000
0 50 100 200 m

Historic Resources–Oakland Touchdown Area
Replacement Alternative S-4

Figure 6-8

4/12/01



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

GRAPHIC SCALE 1:7,000

0 50 100 150 m

Oakland Army Base Property for Proposed Gateway Park

Figure 6-9

3/10/01

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PROJECT

View of Existing Bridge
from Treasure Island Viewpoint

Figure 6-10

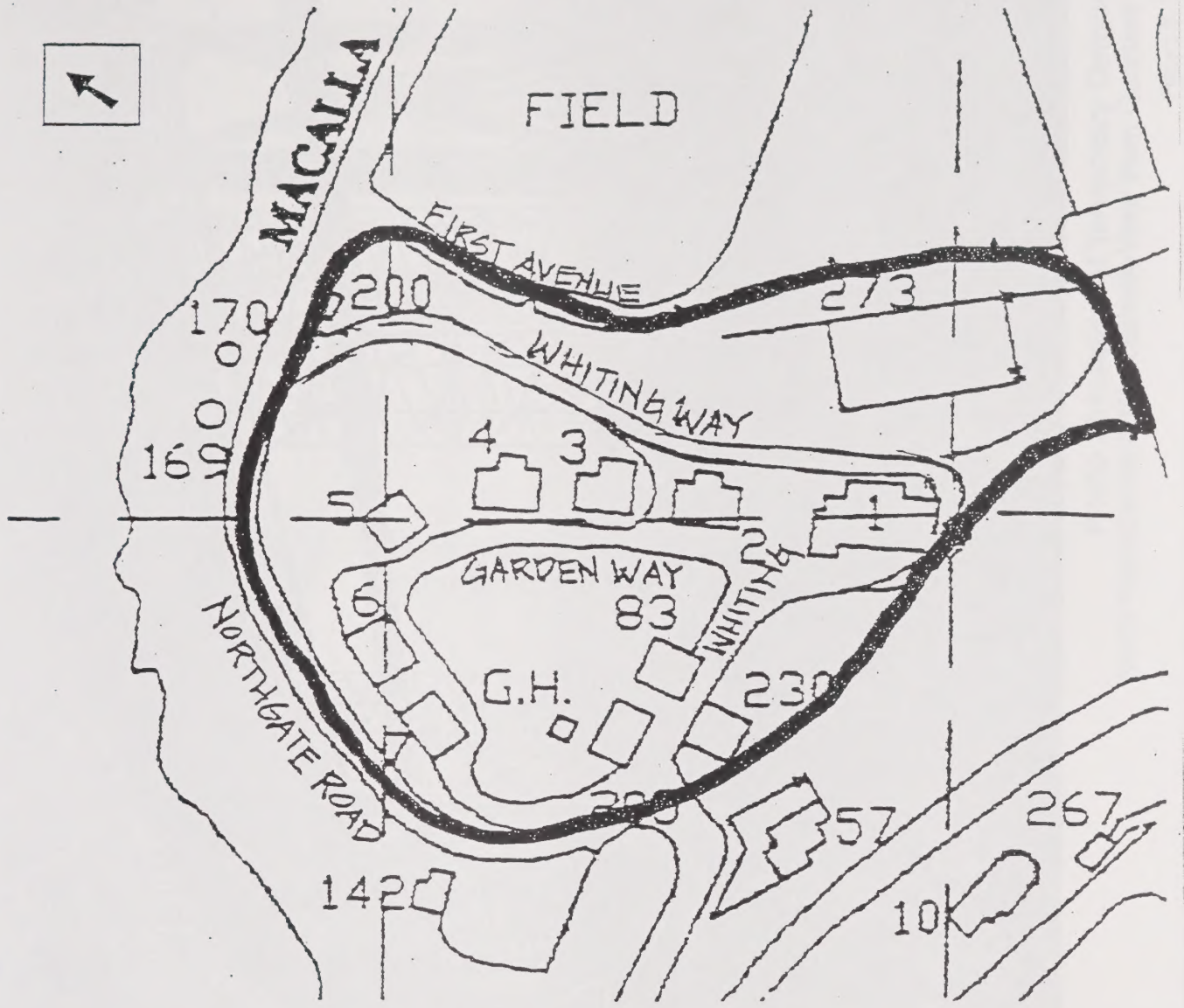
10/3/01

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Photo Simulation Retrofit Existing Bridge Design
from Treasure Island Viewpoint

Figure 6-11

3/10/01



Source: Map of District Boundary for Senior Officers' Quarters Historic District, Prepared by U.S. Navy, January 1997.

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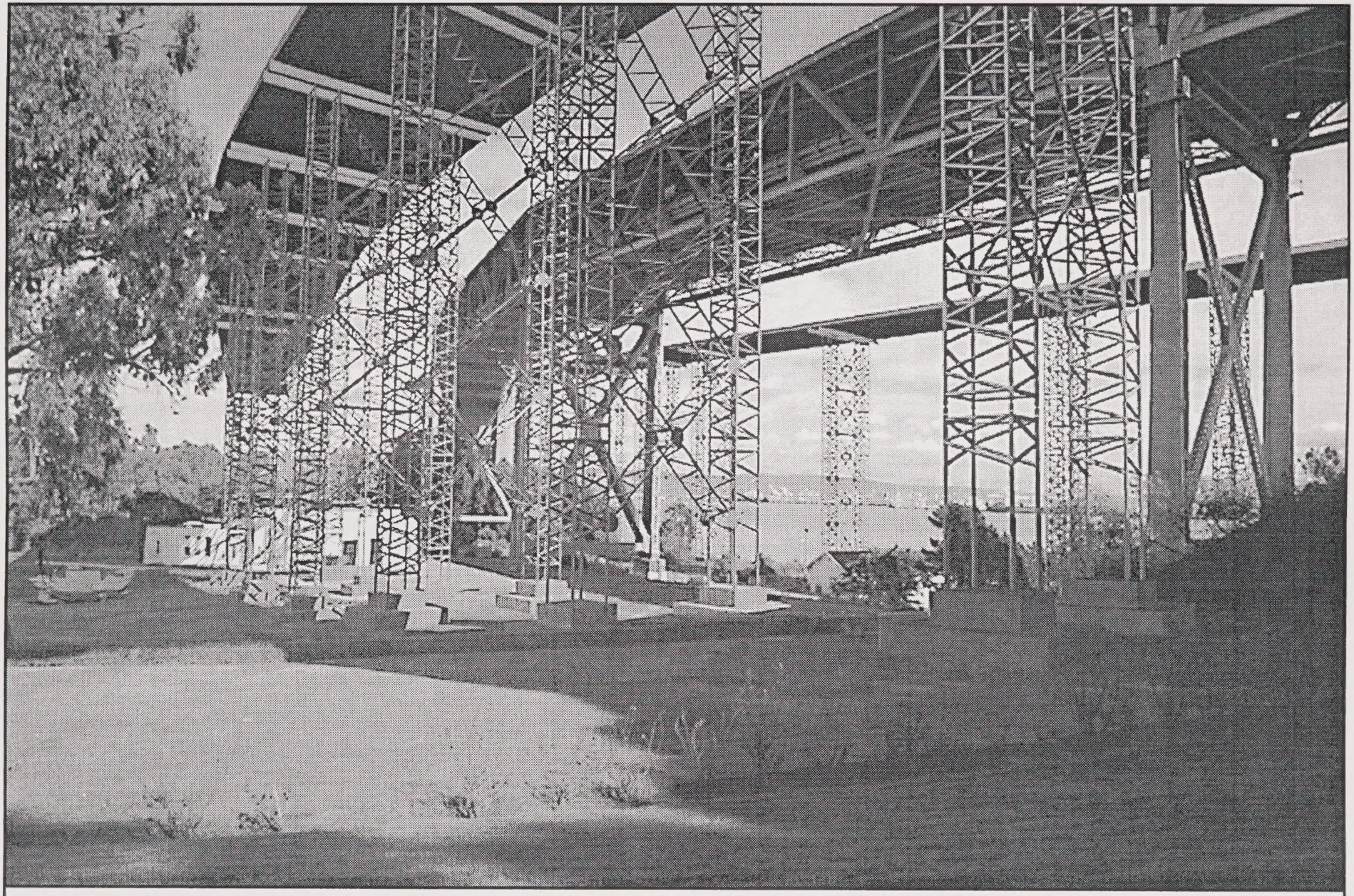
PROJECT

Senior Officers' Quarters
Historic District Boundary

Figure 6-12



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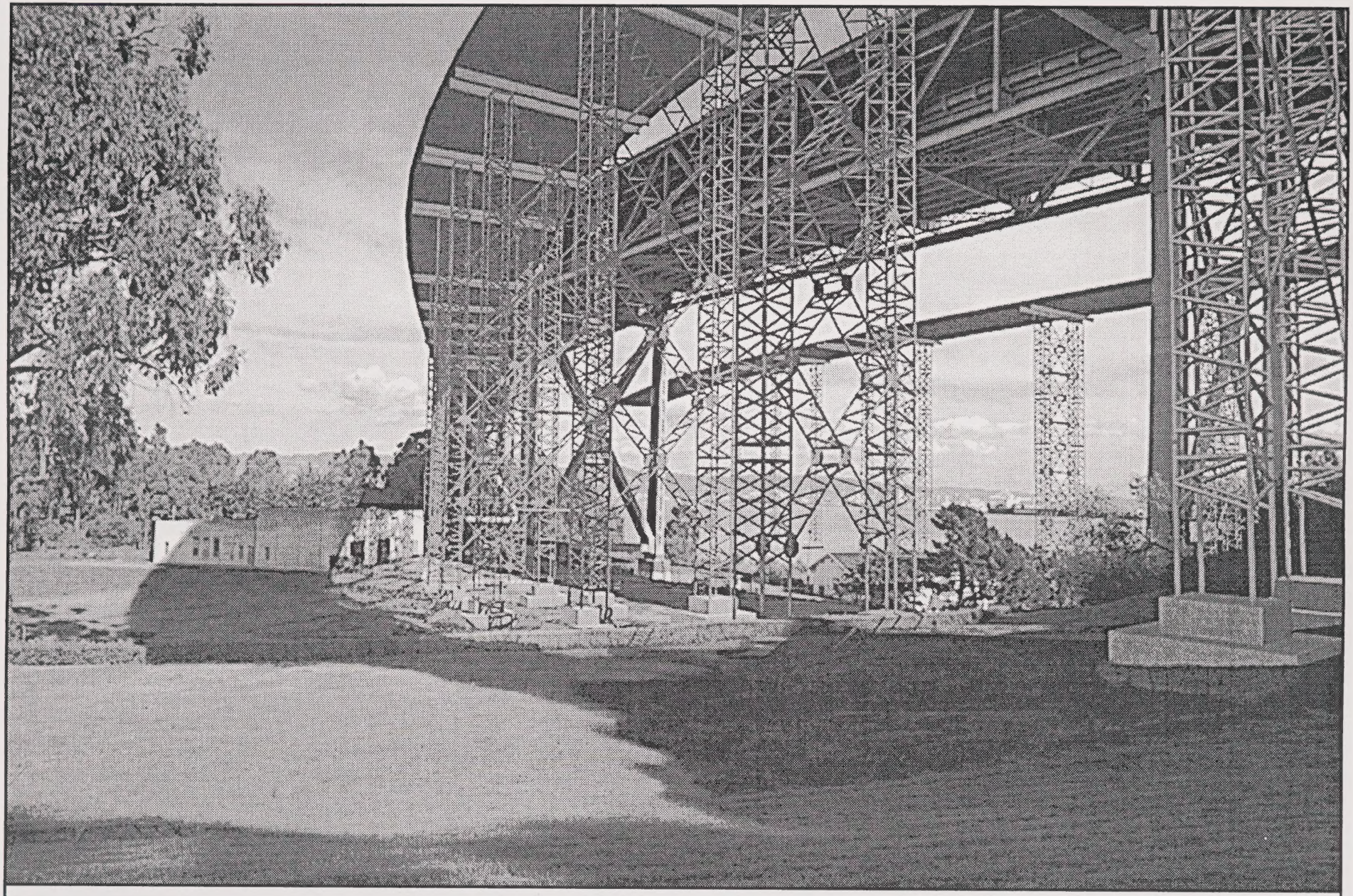
EAST SPAN
SEISMIC SAFETY
PROJECT

Photo Simulation of Temporary Detours
North Replacement Alternatives–View from Quarters 1

Figure 6-13

3/10/01



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PROJECT

Photo Simulation of Temporary Detours
Replacement Alternative S-4–View from Quarters 1

Figure 6-14

3/10/01

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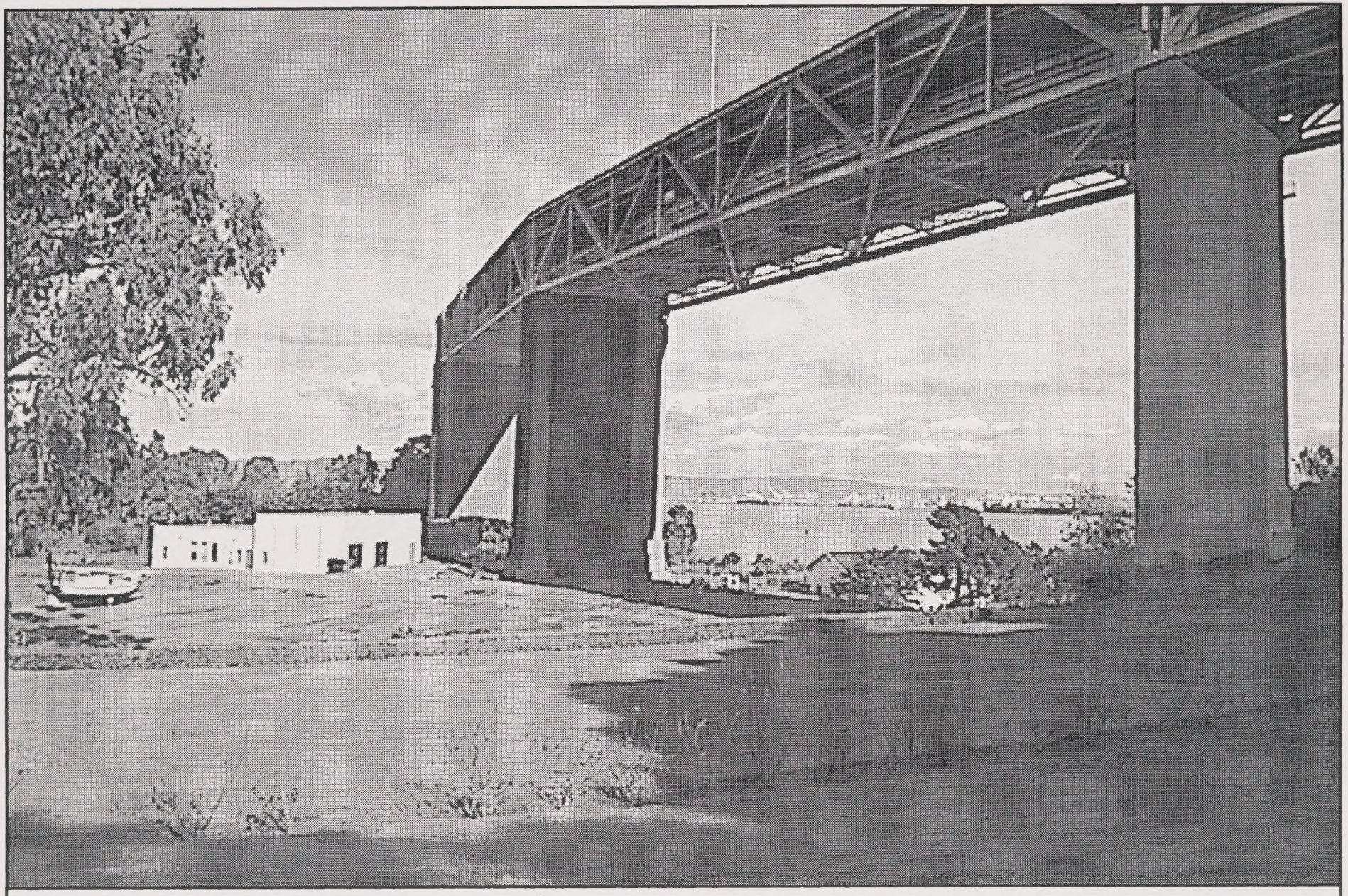
EAST SPAN
SEISMIC SAFETY
PROJECT

Existing View from Quarters 1

Figure 6-15

3/10/99

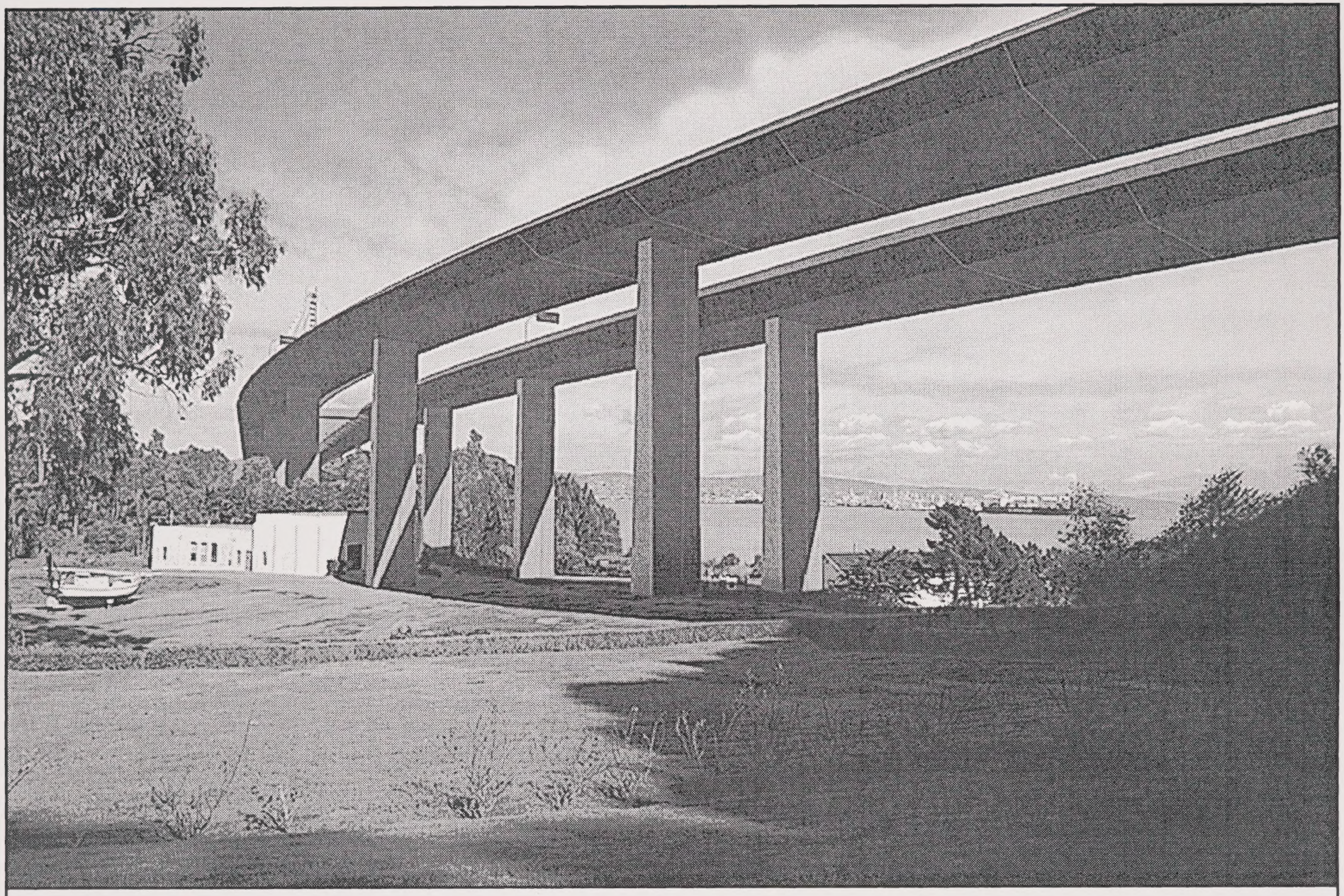


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Photo Simulation, Retrofit Existing Bridge Design–
View from Quarters 1

Figure 6-16

3/10/01

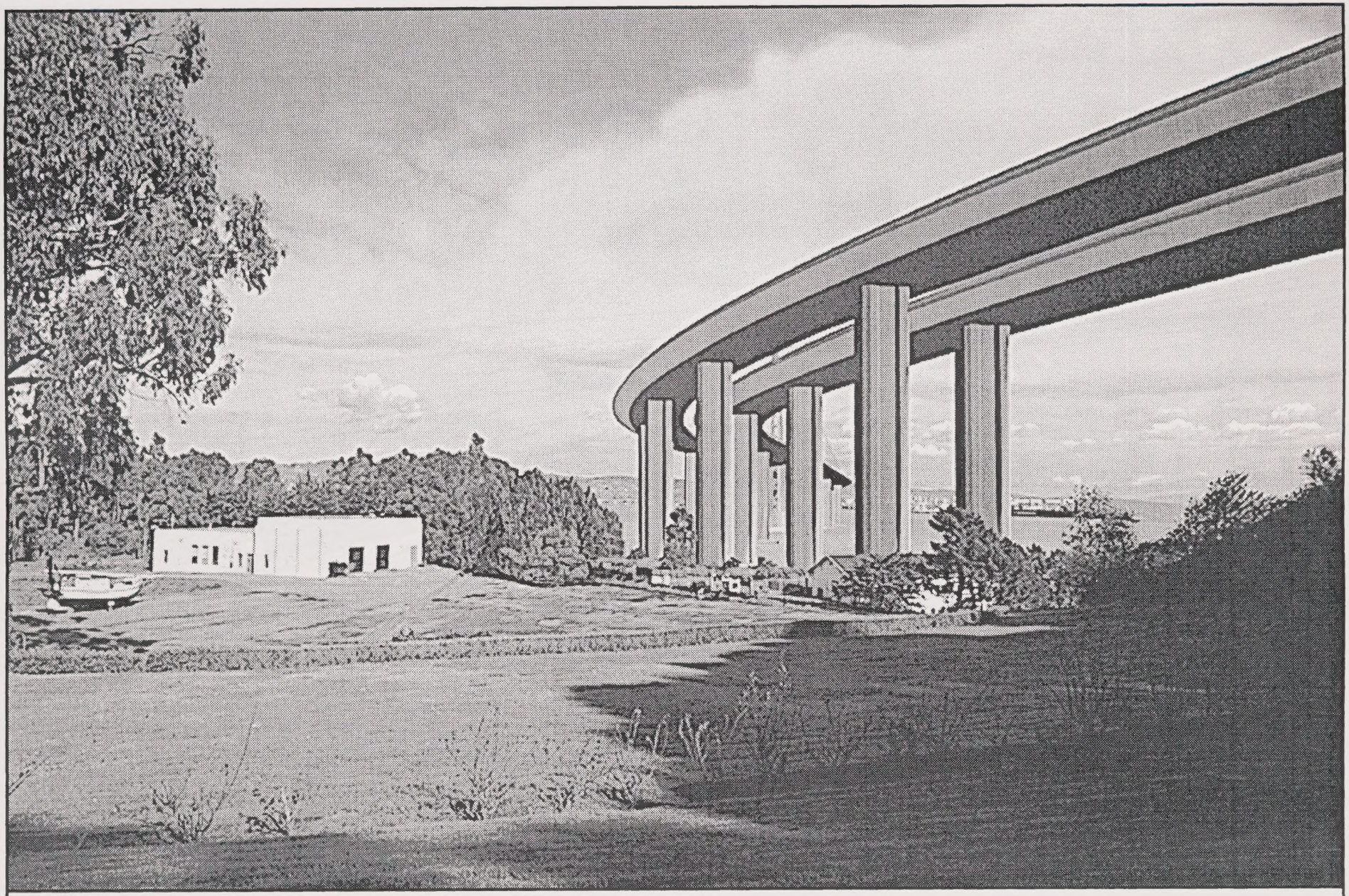


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Photo Simulation of North Replacement Alternatives–View from Quarters 1

Figure 6-17

3/10/01

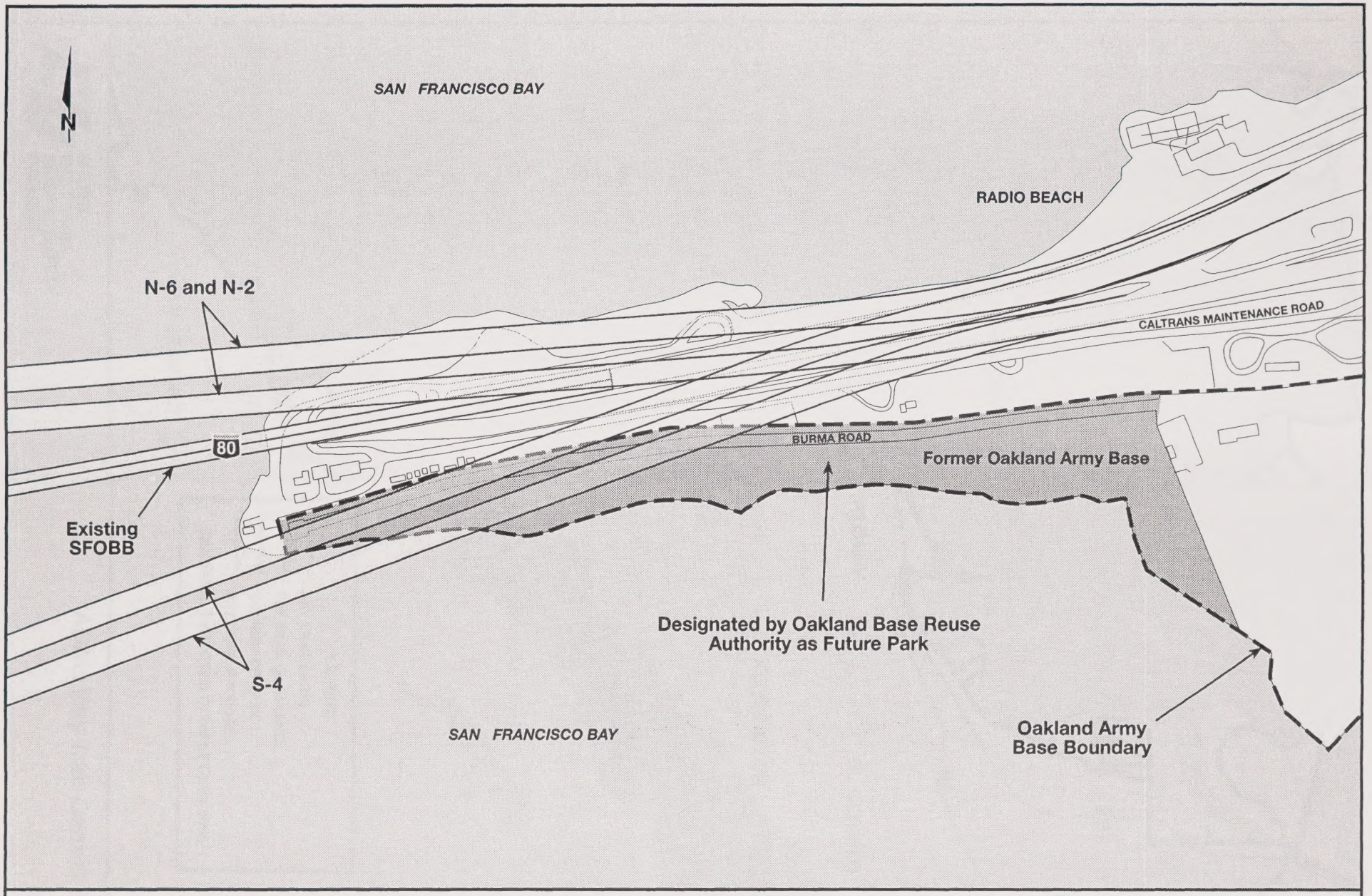


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Photo Simulation of Replacement
Alternative S-4–View from Quarters 1

Figure 6-18

3/10/01



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

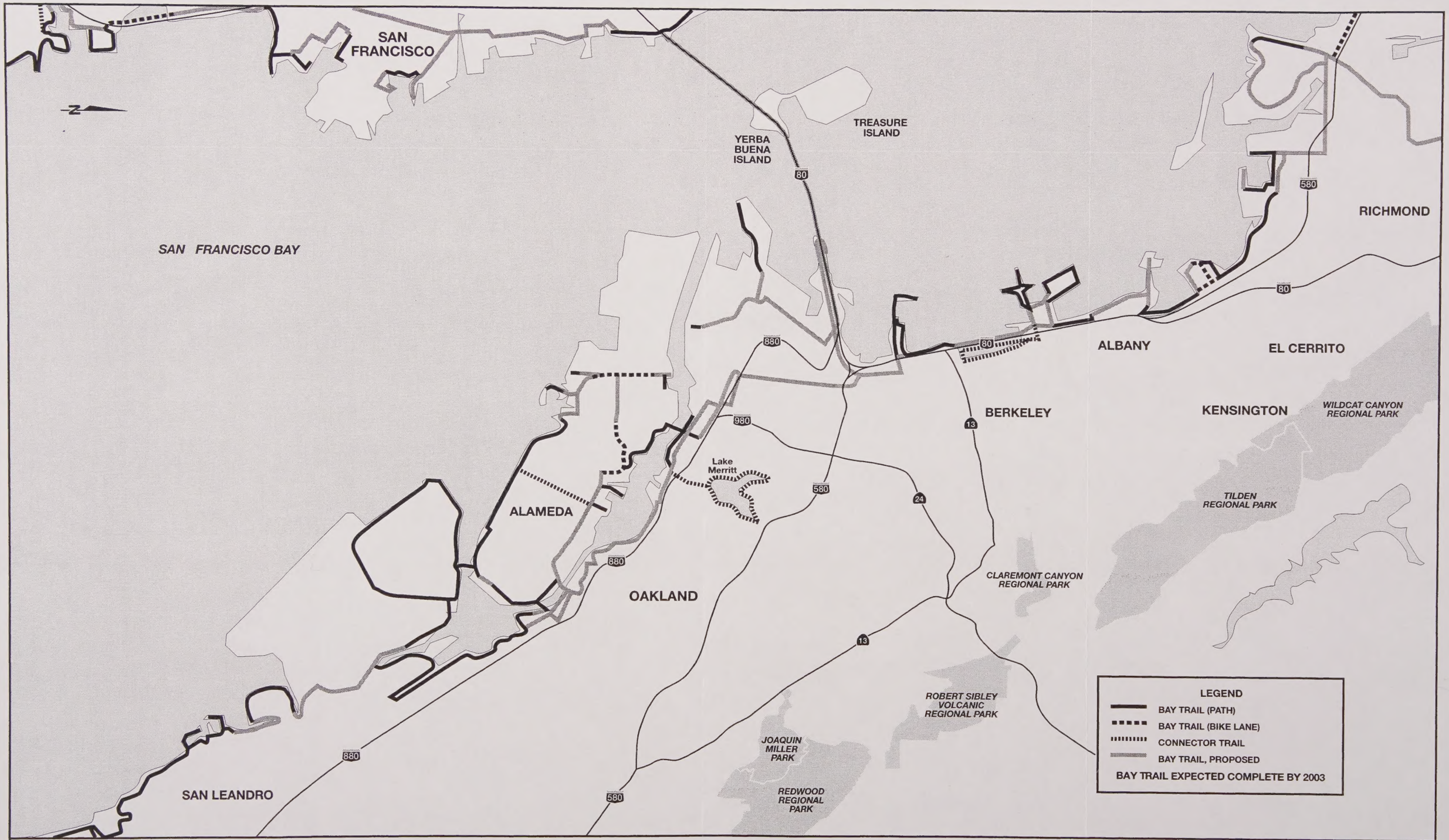
GRAPHIC SCALE 1:7,000

0 50 100 150 m

Build Alternatives in Relation to Proposed Gateway Park

Figure 6-19

3/10/01



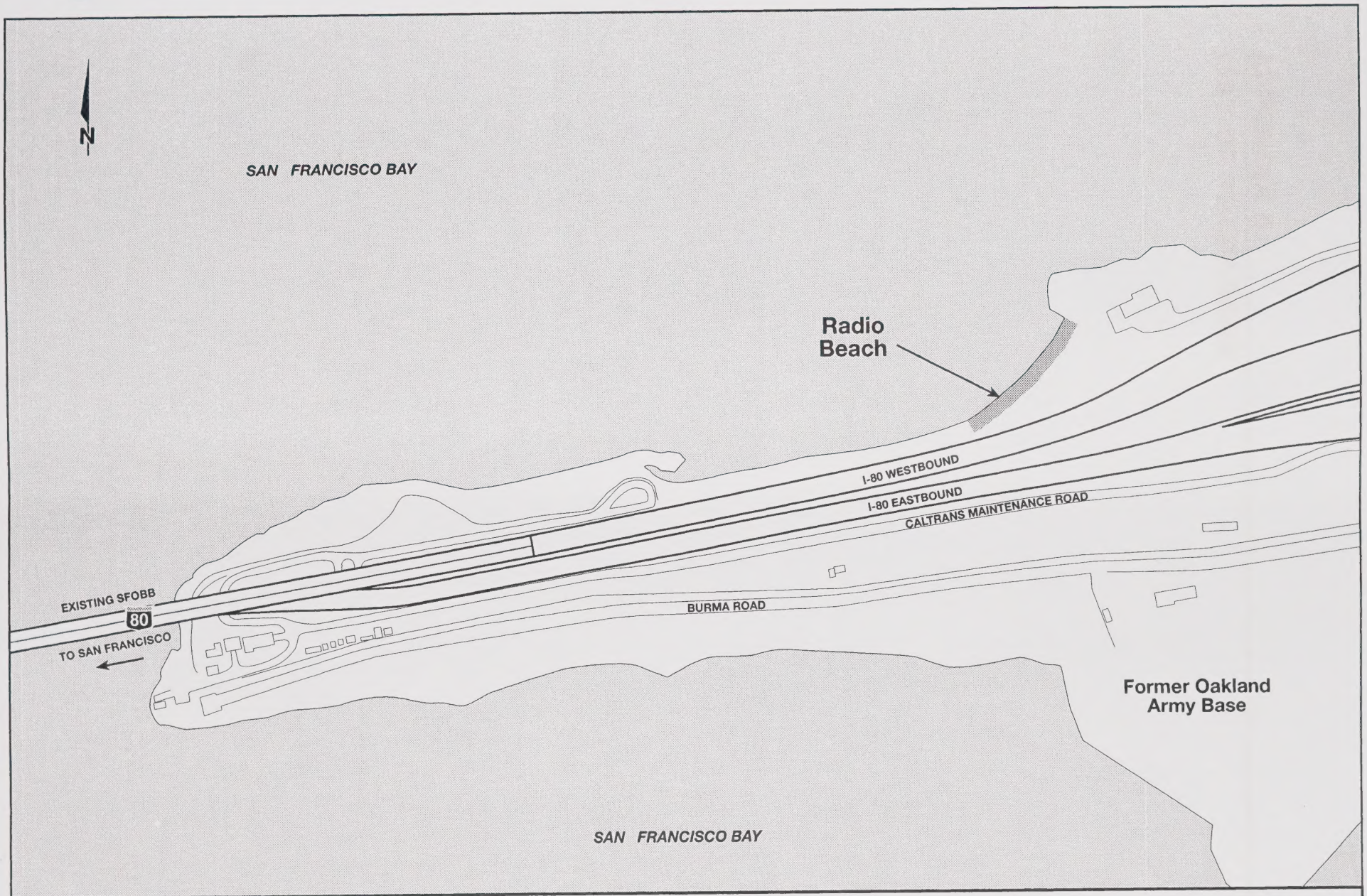
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NO SCALE

ABAG Bay Trail-Central East Bay

Figure 6-20

3/10/01



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

GRAPHIC SCALE 1:5,000

0 50 100 200 m

Radio Beach

Figure 6-21

3/10/01

APPENDIX B
LIST OF PREPARERS

APPENDIX B
LIST OF PREPARERS

Caltrans District 4 - Environmental Evaluation Team

Annie Amundsen, Landscape Associate. M.L.A. Landscape Architecture; 3 years of experience in landscape architecture.

Allen Baradar, R.E.A., P.E., Senior Transportation Engineer. B.S. Metallurgical Engineering; 8 years experience in environmental engineering (hazardous waste, water quality, dredging, and regulatory compliance).

Clive Endress, Senior Landscape Architect. B.S. Landscape Architecture; 22 years experience in visual analysis.

Rachel Falsetti, P.E., Office Chief - SFOBB Specifications and Estimates. B.S. Civil Engineering; 15 years experience in bridge management, design, and construction.

Nick Fiorentinos, Right-of-Way Agent. B.A. Speech and Communication Studies; 10 years of experience in right-of-way activities.

Michael Flake, P.E., Senior Transportation Engineer. B.S. Civil Engineering; 8 years experience in environmental engineering, including water quality and hazardous waste analyses.

Andrew Hope, Associate Environmental Planner. M.A. Architecture; 12 years experience in architectural history and historic preservation.

Jeffrey Jensen, Associate Environmental Planner. M.A. Urban Planning, B.A. Public Policy; 10 years experience in environmental planning.

John Krause, Environmental Planner. B.S. Natural Sciences; 3 years experience in land use planning and land management.

Bev McIntosh, Associate Biologist. M.A. Biogeography, B.A. Geography; 25 years practicing biology and teaching physical geography.

Mara Melandry, Environmental Manager. M.Phil. Anthropology, B.A. Anthropology; 27 years experience in environmental planning with a specialty in historic preservation.

Saba Mohan, Transportation Engineer, M.S. Civil Engineering; 5 years experience in civil engineering.

John Mook, P.E., Senior Bridge Engineer, B.S. Mechanical Engineering; 12 years experience in construction, design, maintenance, and budgeting.

Marilee Mortenson, Senior Environmental Planner. B.S. Geology; 9 years experience in environmental planning.

Kristin Opbroek, Landscape Associate. B.S. Landscape Architecture; 3 years experience in landscape architecture.

Rod Oto, P.E., Senior Transportation Engineer. B.S. Civil Engineering; 20 years experience in traffic operations.

Janet Pape, Senior Environmental Planner/Archaeologist. M.A. Cultural Resource Management; 19 years experience in California archaeology.

Mark Shindler, Senior Right-of-Way Agent. B.S. Business Management; 15 years of experience in Right-of-Way activities.

Charles Smith, P.E., Environmental Engineer, B.S. Civil Engineering; 7 years experience in hazardous waste management.

Don Stratton, Associate Right-of-Way Agent. B.S. Business; 20 years experience in right-of-way and performing housing/relocation studies.

Vong Toan, P.E., Structural Oversight Engineer; M.S. Civil Engineering; 18 years experience in design and construction.

Mike Whiteside, P.E., Assistant Structure Contract Manager. B.S. Civil Engineering; 13 years experience in design, construction, and management of bridge projects.

Victor Zeuzem, P.E., Senior Environmental Engineer. A.A. Civil Engineering; 15 years in air quality, traffic noise, and energy analyses.

Parsons Brinckerhoff Quade & Douglas, Inc.

Mark Aikawa, P.E., Civil Engineering Manager. B.S. Civil Engineering; 12 years experience on highway and rail projects.

Patricia Berryhill, Afilliate Natural Resource Consultant, B.S. Natural Resource Conservation; 12 years experience in environmental planning.

Helise Cohn, Senior Transportation Planner. M.S. Civil Engineering (pending), B.S. Mathematics; 11 years experience in transportation planning.

Timothy K. Dougherty, P.E., Civil and Environmental Consultant Team Manager. B.S. Construction Engineering Technology; 22 years of highway engineering design and heavy construction experience.

Ivy Edmonds-Hess, Lead Environmental Planner. B.S. Meteorology; 11 years experience in environmental planning and air quality analysis.

Elizabeth Heffner, Associate Transportation and Environmental Planner. B.A. Geography; 2 years experience in environmental and transportation planning.

Edward Heyd, Associate Environmental Planner. B.A. History; 1 year of experience in environmental planning.

Ken Jong, P.E., former Civil and Environmental Consultant Team Manager. B.S. Civil Engineering; 17 years experience in transportation engineering and project management.

Susan Killen, Senior Supervising Planner. M.Ed. Education, B.A. Art/Education; 20 years experience in environmental planning and the preparation of Major Investment Studies.

Robert Malone, Associate Environmental Planner. Master of Regional Planning, B.S. Management; 2 years experience in environmental/transportation planning and geographic information system (GIS) applications.

Brady Nadell, P.E., Civil Engineer. B.S. Civil Engineering; 8 years experience in civil/highway design.

Stephen Noack, Lead Environmental Planner. M.S. Urban and Regional Planning; 23 years experience in environmental planning.

Rita Poon, Administrative Assistant. B.A. Liberal Studies; 14 years experience.

Shadde Rosenblum, Transportation Planner. Master of Urban and Regional Planning, B.A. International Studies; 3 years experience in environmental/transportation planning.

Jones & Stokes Associates, Inc.

Mike Davis, Environmental Manager. M.A. Urban and Regional Planning, B.A. Geography; 20 years experience in environmental and transportation planning.

Public Affairs Management

Scott Steinwert, Principal Environmental Planner. B.A. Biology; 13 years experience in community and environmental planning.

Steve Wertheim, Assistant Planner. B.A. Public Policy; 4 years experience in environmental planning and public involvement.

Kay Wilson, President. M.A. Regional & Community Planning, B.A. Political Science; 31 years experience in community and environmental planning.

URS Greiner

Vance Bente, Senior Consultant. M.A. Anthropology; 26 years experience in cultural resources management.

Laura Cholodenko, Staff Biologist. B.A. Environmental Studies; 5 years experience in wildlife management and research.

Sean Dexter, Senior Staff Archaeologist. B.A. Anthropology; 10 years of experience in cultural resource management/environmental planning.

Steve Kellogg, Associate Scientist. M.A. Biology, B.S. Biology; 27 years of experience in environmental impact statements and biological assessments.

Steve Leach, Wetlands Biologist. M.S. Botany, B.S. Geography; 10 years of experience in biological assessments.

Corinna Lu, Biologist. M.A. Geography, B.S. Biology; 3 years experience in wildlife biology.

William Martin, Senior Water Quality Scientist. B.S. Oceanography; 15 years experience with biological impact assessments and water quality and marine resource issues.

Sally Morgan, Senior Scientist. M.A. Anthropology; 25 years experience in cultural resources management and Section 106 compliance.

Jeff Zimmerman, Senior Environmental Planner. B.S. Conservation of Natural Resources; 20 years of experience in environmental planning.

APPENDIX C
DISTRIBUTION LIST

APPENDIX C
DISTRIBUTION LIST

ELECTED OFFICIALS

U.S. Senators

The Honorable Barbara Boxer
U.S. Senate
1700 Montgomery Street, Suite 240
San Francisco, CA 94111

The Honorable Dianne Feinstein
U.S. Senate
525 Market Street, Suite 3670
San Francisco, CA 94105

U.S. House of Representatives

The Honorable Anna Eshoo
U.S. House of Representatives
698 Emerson Street
Palo Alto, CA 94301

The Honorable Mike Honda
U.S. House of Representatives
3550 Stevens Creek Boulevard
Campbell, CA 95117

The Honorable Tom Lantos
U.S. House of Representatives
400 South El Camino Real, Suite 820
San Mateo, CA 94402

The Honorable Barbara Lee
U.S. House of Representatives
1301 Clay Street, Suite 1000N
Oakland, CA 94612

The Honorable Zoe Lofgren
U.S. House of Representatives
635 North First Street, Suite B
San Jose, CA 95112

The Honorable George Miller
U.S. House of Representatives
1333 Willow Pass Road, Suite 203
Concord, CA 94520-7931

The Honorable Doug Ose
U.S. House of Representatives
722-B Main Street
Woodland, CA 95695

The Honorable Nancy Pelosi
U.S. House of Representatives
450 Golden Gate Avenue,
Room 145380
San Francisco, CA 94102

The Honorable Fortney Pete Stark
U.S. House of Representatives
39300 Civic Center Drive, Suite 220
Fremont, CA 94538-2324

The Honorable Ellen Tauscher
U.S. House of Representatives
1801 North California Blvd., Suite 103
Walnut Creek, CA 94596

The Honorable Michael Thompson
U.S. House of Representatives
1040 Main Street, Suite 101
Napa, CA 94559

The Honorable Lynn Woolsey
U.S. House of Representatives
1101 College Ave., Suite 200
Santa Rosa, CA 95404-3952

California State Senate

The Honorable John Burton
California State Senate
455 Golden Gate Avenue, Suite 14800
San Francisco, CA 94102

The Honorable Wes Chesbro
California State Senate
50 D Street, Suite 120-A
Santa Rosa, CA 95404

The Honorable Liz Figueroa
California State Senate
43271 Mission Blvd.
Fremont, CA 94539

The Honorable Maurice Johannessen
California State Senate
410 Hemsted Drive, Suite 200
Redding, CA 96002

The Honorable Don Perata
California State Senate
1515 Clay Street, Suite 2202
Oakland, CA 94612

The Honorable Jackie Speier
California State Senate
455 Golden Gate Avenue, Suite 14200
San Francisco, CA 94014

The Honorable Tom Torlakson
California State Senate
1948 Mount Diablo Blvd.
Walnut Creek, CA 94596

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APPENDIX D
DEFINITIONS AND ACRONYMS

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DEFINITIONS

Abutment - A stone, concrete, brick, or timber structure supporting the end of a span.

Advisory Council on Historic Preservation (ACHP) - An independent federal agency that provides a forum for influencing federal policy, programs, and activities as they affect historic and archaeological resources in communities and on public lands nationwide.

Alluvial - Resulting from the operations of water, including floodplains, lakes, rivers, and fans at the foot of mountain slopes.

Anchorage - An assemblage of material designed to hold in correct position the anchor span of a cantilever bridge or the end of a suspension span cable.

Attainment area - An area that meets air quality standards.

Attenuation - The reduction of noise.

San Francisco Bay Regional Water Quality Control Board (RWQCB) - An agency with the California Environmental Protection Agency that is responsible for regulating pollutants to protect the water resources of the Bay Area.

Bay mud - Soft to stiff silty clay with some shell fragments that is found in the Bay. It is generally unsuitable for structure foundations.

Bedrock - Solid rock that underlies all soil, sand, clay, gravel, and loose material on the earth's surface.

Bent - A bridge support column founded on land.

Biological opinion - A document that is the product of formal consultation, stating the opinion of the USFWS on whether or not a federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

Bracing - A system of tension or compression members that supports a truss or frame.

Cable - The part of a bridge that has the function of receiving the bridge floor loads and transmitting them to the towers and the anchorages.

Cable-stayed span - A span that involves steel cables that connect towers directly to support the bridge deck.

California Department of Fish and Game (CDFG) - The state agency that manages California's wildlife and plant resources.

California Department of Transportation (Caltrans) - Responsible for planning, designing, building, operating, and maintaining California's state highway system.

Candidate species - Any species of fish, wildlife, or plant which has been determined to be candidates for listing under Section 4 of the Endangered Species Act of 1973 (amended).

Cantilever span - A general term applying to a bridge having a superstructure of the cantilever type (supported at one end only).

Coastal Zone Management Act (CZMA) - The CZMA regulates development in coastal areas to protect the unique resources in such areas.

Cofferdam - A temporary water-tight enclosure built in the water and pumped dry to expose the bottom so that construction of piers can be undertaken.

Column - A supporting pillar.

Contaminant source - A facility that treats, stores, or disposes of hazardous waste, uses hazardous substances, or stores petroleum products on site.

Cultural resources - Archaeological and historic resources eligible for or listed on the National Register of Historic Places. Cultural resources include buildings, sites, districts, structures, or objects having historical, architectural, archaeological, cultural, or scientific importance.

Cumulative impact - The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

Day-Night Equivalent Sound Level (Ldn) - A 24-hour equivalent sound level with a 10 dB penalty assessed to noise events occurring at night (10:00 p.m. to 7:00 a.m.).

dBA - A sound level in decibels, measured with a sound level meter having metering characteristics and frequency weighting specified in American National Standard Specifications for sound level meters (ANSI S1.4-1971). It is common to refer to numerical units of an A-weighted sound level as "dBA."

Deck - The portion of a bridge that provides direct support for vehicular, bicycle, and/or pedestrian traffic.

Draft Environmental Impact Statement (DEIS) - A draft report that analyzes potential environmental impacts of a proposed project in compliance with NEPA.

Dredged Material Management Office (DMMO) - An interagency coordination group, consisting of the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the San Francisco Bay Conservation and Development Commission, the State Lands Commission, and the Regional Water Quality Control Board, that determines the suitability of in-Bay disposal for dredged materials.

Edge truss - Horizontal trusswork that is extended from the base of a lower deck to the bottom of an upper deck.

Endangered species - Any species of wildlife or plant which has been determined to be endangered under Section 4 of the Endangered Species Act of 1973 (amended). This definition is adopted from the USFWS, Section 7 regulations, 51 FR 19926.

Equivalent Sound Level (L_{eq}) - A measure of sound energy over a period of time, or a sound level which, in a stated period of time, would contain the same acoustical energy as the time-varying sound during the same period.

Expansion joint - A joint designed to provide means for expansion and contraction movements produced by temperature changes, loadings, or other means.

4 (f) resources - Resources protected by Section 4(f) of the Department of Transportation Act. These include public park and recreation lands, wildlife and waterfowl refuges, and historic sites eligible or listed on the National Register.

Falsework - A temporary wooden or metal framework built to support a structure under construction until that structure is self-supporting.

Federal Aviation Administration (FAA) - The federal agency that issues and enforces regulations and standards related to the manufacture, operation, certification, and maintenance of aircraft.

Federal Highway Administration (FHWA) - The federal agency that coordinates highway transportation programs in cooperation with states and other partners. It provides federal financial assistance to the States to construct and improve the National Highway System, urban and rural roads, and bridges.

Federal Transit Administration (FTA) - The federal agency that provides financial and technical assistance to local transit systems. It also assists in the development of local and regional traffic reduction programs.

Fill - Earth used to create embankments or to raise low-lying areas in order to bring them to grade. Under the Clean Water Act (ACOE jurisdiction), fill is defined as material used for the primary purpose of replacing an aquatic area with dry land, or a change in the bottom elevation of a water body. Under the McAteer-Petris Act (BCDC jurisdiction), fill is defined as any solid, pile-supported, floating, cantilevered, or

suspended material that is placed bayward of the Mean High Tide Line, or the +1.5-meter (5.0-foot) contour line where marshlands are present.

Final Environmental Impact Statement (FEIS) - A document that responds to comments received on the DEIS and provides updated information that has become available after publication of the DEIS.

Floodplain - The part of the ground surface inundated with water on a recurring basis, usually associated with the one percent recurrence interval (100-year) flow.

Footing - The enlarged, or spread-out, lower portion of a substructure, which distributes the structure load either to the earth or to supporting piles.

Foundation - The supporting material upon which the substructure portion of a bridge is placed.

Franciscan Formation - Regional bedrock that is approximately 90 to 160 million years old. It is composed of sandstone and shale and is generally highly weathered.

General Plan - A document that contains policies used to implement the goals of a community.

Geomorphic - Of the earth's surface configuration.

Girder - A horizontal beam used as a main support for a structure.

Grade - A slope or gradual incline.

Groundwater - Water beneath the earth's surface between saturated soil and rock that supplies wells and springs.

Haunched girder - An arched beam used between support piers.

High Occupancy Vehicle (HOV) - Vehicles occupied by two (sometimes three) or more persons such as carpools and buses.

High Occupancy Vehicle Lane (HOV Lane) - A system of exclusive lanes signed and striped for use by vehicles with multiple occupants (two or more or three or more persons). HOV lanes are designed on roadways to reduce traffic congestion, improve safety, reduce fuel consumption, and improve air quality.

Historic American Building Survey (HABS) - Founded by the National Park Service to document and archive significant historic architectural works.

Historic American Engineering Record (HAER) - Founded to document and archive significant engineering and industrial sites.

Inundation - The act of covering with water.

Isolator bearing - A bearing developed to protect structures against earthquake damage. Under seismic loading, the bearing becomes more flexible. This allows it to isolate the structure from the effects of earthquake motion.

Landscape unit - A geographically distinct portion of an area that has a particular visual character.

Lateral bracing - A horizontal bracing assemblage on a structure. Its function is to help the structure resist wind, lateral vibration, and traffic movement tending to produce lateral movement and deformation.

Lattice work - A structure made of lattices that is used to secure another structure in place.

Least Environmentally Damaging Practicable Alternative (LEDPA) - This designation is identified under the Federal Clean Water Act Section 404 (b)(1) alternatives evaluation process. The Section 404 (b)(1) process requires ACOE and EPA to make a determination of the LEDPA for any action involving discharge of dredge or fill material into waters of the U.S.

Level of Service (LOS) - The operating level of an intersection or roadway segment can be described using the term Level of Service. Level of Service is a qualitative description of operation based on delay and maneuverability. It can range from "A" representing free flow conditions to "F" representing gridlock.

Lifeline - A connection that provides for post-earthquake relief access linking major population centers, emergency relief routes, emergency supply and staging centers, and intermodal links to major distribution centers.

Liquefaction - The loss of strength that can occur in loose, saturated soil during or following seismic shaking. This condition can produce a number of ground effects, including lateral spreading, boils, ground lurching, and settlement of fill material.

Maintenance area - An area that had previously been designated a non-attainment area, but now meets applicable air quality standards.

Marine Mammal Protection Act - Provides for the protection and conservation of marine mammal species.

Maximum Credible Earthquake (MCE) - The largest earthquake reasonably capable of occurring based on current geological knowledge.

Metamorphic - Pertaining to an alteration in composition, texture, or structure of rock masses caused by great heat and/or pressure.

Metropolitan Transportation Commission (MTC) - The transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay

Area. It functions both as the region's metropolitan transportation planning agency (RTPA) and as the region's metropolitan planning organization (MPO)—state and federal designations, respectively.

Migratory Bird Treaty Act of 1918 - Reflects agreements involving the United States, Great Britain (for Canada), Mexico, Japan, and the former Soviet Union to protect migratory bird populations.

Mitigation - Measures taken to minimize adverse environmental impacts. Mitigation could reduce the magnitude and extent of an impact from a level of significance to a level of insignificance.

National Environmental Policy Act (NEPA) - The United States' basic national charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy.

National Geodetic Vertical Datum (NGVD) - A fixed surface reference established by the U.S. Coast and Geodetic Survey in 1929 as the datum to which relief features and elevation data are referenced.

National Historic Preservation Act of 1966 - The primary federal law pertaining to protection of cultural resources, referred to as Section 106.

National Marine Fisheries Service (NMFS) - The part of the National Oceanic and Atmospheric Administration that oversees the Administration's programs which support the domestic and international conservation and management of living marine resources.

National Register eligible - Cultural resources eligible for inclusion on the National Register of Historic Places.

National Register of Historic Places - A federal listing of historic resources protected under the National Historic Preservation Act of 1966.

Navigation channel - An area of water used for marine vessel travel under bridges.

Non-attainment area - An area that does not meet air quality standards.

Noise Abatement Criteria - Noise level standards above which noise reducing actions should be considered.

Outfall - The place where a sewer, drain, or stream discharges into adjacent water.

Pier - A structure composed of stone, concrete, brick, steel or wood and built in shaft or block-like form to support the ends of the spans of a multi-span superstructure at an intermediate location between its abutments.

Pile - A rod or shaft-like linear member driven into the earth as a foundation or support for a structure.

Pile cap - The topmost portion of a pier. On rigid frame piers, the term applies to the beam across the column tops.

Portal - The clear unobstructed space of a through bridge forming the entrance to the structure.

Profile - refers to the rise in roadway elevation.

Record of Decision - A public document that explains the reasons for a project decision and summarizes any mitigation measures that will be incorporated in the project.

Right-of-way - Land, property, or interest therein, acquired for infrastructure such as a highway, railbed, pipeline, electric power lines, or telephone facilities. The land has been set aside as an easement or in fee, either by agreement or by condemnation.

Riparian - An aquatic or terrestrial ecosystem that is associated with bodies of water, such as streams, lakes, or wetlands, or is dependent upon the existence of perennial, intermittent, or ephemeral surface or subsurface water drainage. Riparian areas are usually characterized by dense vegetation and an abundance and diversity of wildlife.

Riprap - Brickbats, stones, blocks of concrete or other materials deposited upon shores to prevent erosion and scour by water flow.

Rock-wedge Failure - A movement or sliding of rock mass, possibly including overlying soil, along existing discontinuities such as fractures or joints within the rock fabric.

Safety Evaluation Event (SEE) - An earthquake that generates the largest motions expected to occur at a site within an established time interval. For the East Span Project, the time interval is 1,500 years.

San Francisco Bay Conservation and Development Commission (BCDC) - The state agency responsible for protecting and enhancing the San Francisco Bay. Two of its mandates are to prevent the unnecessary filling of the San Francisco Bay and to increase public access to and along the Bay shoreline. BCDC is also the federally designated state coastal management agency for the San Francisco Bay segment of the California coastal zone authorized under the federal Coastal Zone Management Act.

Sediment Sampling and Analysis - The process of evaluating the physical, chemical, and biological make-up of potential dredged sediment.

Self-anchored suspension bridge - A suspension bridge where cables are anchored in the bridge deck itself, eliminating the need for traditional anchorage structures.

Shoal - A place in a body of water where the water is particularly shallow.

Silt - A sedimentary material consisting of fine mineral particles in size between sand and clay.

Skyway span - A span that is supported from under the bridge deck by piers.

Special status species - Any species of fish, wildlife, or plant that is officially listed as rare, threatened, endangered, or candidate for rare, threatened, or endangered species listing under the state or federal Endangered Species Acts.

Spit - A narrow point of land extending into a body of water.

State Implementation Plan (SIP) - A plan for attaining national ambient air quality standards required by the Clean Air Act.

State Office of Historic Preservation - The state agency that assists private citizens, private institutions, local governments, and state and federal agencies in the identification, evaluation, protection, and enhancement of properties significant in California history and archaeology; also responsible for reviewing federal undertakings that affect cultural resources on or eligible for the National Register of Historic Places.

Stress - An applied force or system of forces that tends to strain or deform a body.

Substructure - The abutments, piers, or other constructions built to support the span or spans of a bridge. The superstructure is supported by the substructure; the substructure is placed on the foundations.

Superelevation - The transverse inclination of the roadway surface within a horizontal curve. The purpose of superelevation is to provide a means of resisting or overcoming the centrifugal forces of vehicles in transit.

Superstructure - The entire portion of the bridge structure that primarily receives and supports highway, railway or other traffic loads. It is supported by the substructure.

Surface runoff - Water that runs off streets and land and enters a body of water.

Suspension bridge - A span in which cables are draped from towers and connected to anchorages on either end of the bridge, and the bridge deck is supported by vertical connections to the cables.

Tectonic - Pertaining to structural deformations in the earth's surface.

Temporary structure - A structure that is used to support a permanent structure that is temporarily unable to support itself.

Tower - A pier or frame serving to support the cables of a bridge.

Traffic Management Plan - A plan to manage traffic during construction of projects to reduce congestion.

Trestle - A timber, reinforced concrete, or steel structure, usually consisting of many short spans, used to support a temporary or permanent bridge or used temporarily to construct a permanent bridge.

Truss - A jointed structure having an open built web construction so arranged that the frame is divided into a series of triangular figures.

Tsunamis - Seismically induced sea waves that are generated when large subsea earth or rock masses are displaced during earthquakes or very large landslides.

U.S. Army Corps of Engineers (ACOE) - Federal agency with jurisdiction over waters of the U.S.

U.S. Coast Guard (USCG) - Federal agency with jurisdiction over navigable waterways.

U.S. Environmental Protection Agency (EPA) - The federal agency responsible for maintaining environmental quality, including air quality, noise, and hazardous waste management.

U.S. Fish and Wildlife Service (USFWS) - The federal agency that administers the federal Endangered Species Act and is involved in protection of fish and wildlife habitat, including wetland areas.

Viaduct - A series of spans or arches used to carry a road or railroad over a wide valley or over other roads or railroads.

Visual dominance - The contrast between a project and its setting, described in terms of vegetation, landform, and structural changes.

Visual image type - An area that exhibits a fairly homogeneous visual quality. Types that are present in the SFOBB study area include recreational, industrial, institutional/military, historical, and open space.

Watershed - the point of high ground dividing two different drainage systems.

Waterway - The available width for the passage of water beneath a bridge.

Wetlands - According to regulations of the U.S. Army Corps of Engineers, wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, under normal conditions, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and similar areas and are subject to protection under Executive Order 11990 and Section 404 of the Clean Water Act.

ACRONYMS

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AATC	Advanced Automatic Train Control
ABAG	Association of Bay Area Governments
AC Transit	Alameda-Contra Costa Transit District
ACHP	Advisory Council on Historic Preservation
ACOE	U.S. Army Corps of Engineers
ADEIS	Administrative Draft Environmental Impact Statement
ADT	Average Daily Traffic
AHC	Ad Hoc Committee on Seismic Ground Motions
APE	Area of Potential Effect
ASR	Archaeological Survey Report
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit District
BATA	Bay Area Toll Authority
BCDC	San Francisco Bay Conservation and Development Commission
BEQ	Bachelor Enlisted Quarters
BMPs	Best Management Practices
BPAC	Bicycle/Pedestrian Advisory Committee
BRAC	Base Realignment and Closure
CAA	Federal Clean Air Act
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCSF	City and County of San Francisco
CDFG	California Department of Fish and Game
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CHP	California Highway Patrol
CIH	Certified Industrial Hygienist
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Survey
CO	Carbon Monoxide
CSHC	California Streets and Highways Code
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
dB	Decibel
dBA	A-weighted decibel
dBA L_{eq}	A-weighted decibel equivalent sound level
DDT	Dichlorodiphenyltrichloroethane
DEIR	Draft Environmental Impact Report

DEIS	Draft Environmental Impact Statement
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Plan
DTSC	California Department of Toxic Substance Control
EA	Environmental Assessment
EB	Eastbound
EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Park District
EDAP	MTC Bay Bridge Design Task Force Engineering and Design Advisory Panel
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Environmentally Sensitive Areas
ESU	Evolutionary Significant Unit
FAA	Federal Aviation Administration
FCWA	Federal Clean Water Act
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FISC	Fleet and Industrial Supply Center
FSTIP	Federal Statewide Transportation Improvement Program
FTA	Federal Transit Administration
ha	Hectare or hectares
HAER	Historic American Engineering Record
HASR	Historic Architecture Survey Report
HCM	Highway Capacity Manual
HOV	High Occupancy Vehicle
HPSR	Historic Property Survey Report
HTL	High Tide Line
HUD	Department of Housing and Urban Development
HWCL	Hazardous Waste Control Law
I	Interstate
IR	Installation Restoration
ISTEA	Intermodal Surface Transportation Efficiency Act
JIT	Joint Intermodal Terminal
km	Kilometer or kilometers
kph	Kilometers per hour
KV	Kilovolt
LEDPA	Least Environmentally Damaging Practicable Alternative
L_{10}	Noise level equaled or exceeded 10% of the time
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Level
LPAB	Landmarks Preservation Advisory Board
LRT	Light Rail Transit
LTMS	Long-Term Management Strategy
LUST	Leaking Underground Storage Tank
m	Meter or meters
MCE	Maximum Credible Earthquake

mg/L	Milligrams per Liter
mg/m^3	Milligrams per Cubic Meter
MHTL	Mean High Tide Line
MHW	Mean High Water
mi	Mile or Miles
MIS	Major Investment Study
MLLW	Mean Lower Low Water
MLW	Mean Low Water
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mph	Miles per hour
MPO	Metropolitan Planning Organization
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSL	Mean Sea Level
MTC	Metropolitan Transportation Commission
MTL	Mean Tide Level
MUNI	San Francisco Municipal Railway
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOD	Notice of Determination
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NSTI	Naval Station Treasure Island
NUAD	Not Suitable for Unconfined Aquatic Disposal
O&M	Operations and Maintenance
OARB	Oakland Army Base
OBRA	Oakland Army Base Reuse Authority
OES	Office of Emergency Services
OSHA	Occupational Safety and Health Administration
PAH	Polyaromatic Hydrocarbon or Polynuclear Aromatic Hydrocarbon
PA/SI	Preliminary Assessment/Site Investigation
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PDT	Project Development Team
PG&E	Pacific Gas and Electric Company
PIDP	Pile Installation Demonstration Project
$PM_{2.5}$	Particulate Matter with an Aerodynamic Diameter less than 2.5 Micrometers
PM_{10}	Particulate Matter with an Aerodynamic Diameter less than Ten Micrometers
ppm	Parts per Million
ROD	Record of Decision

RCRA	Resource Conservation and Recovery Act
RMP	Regional Monitoring Program
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
RWQCB	San Francisco Bay Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SAR	Sediment Sampling and Analysis Report
SARA	Superfund Amendments and Reauthorization Act
SCPBRG	Santa Cruz Predatory Bird Research Group
SEE	Safety Evaluation Event
SF-11	San Francisco In-Bay Disposal Site at Alcatraz
SF – DODS	San Francisco Deep Ocean Disposal Site
SFEI	San Francisco Estuary Institute
SFFD	San Francisco Fire Department
SFOBB	San Francisco-Oakland Bay Bridge
SFWD	San Francisco Water Department
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SUAD	Suitable for Unconfined Aquatic Disposal
SVOC	Semi-Volatile Organic Compound
SWPPP	Storm Water Pollution Prevention Plan
TCE	Temporary Construction Easement
TEA-21	Transportation Equity Act for the 21st Century
TI	Treasure Island
TIDA	Treasure Island Development Authority
TIP	Transportation Improvement Program
TMP	Traffic Management Plan
TPH	Total Petroleum Hydrocarbons
TRPH	Total Recoverable Petroleum Hydrocarbons
TSCA	Toxic Substance Control Act
ug/m^3	Micrograms per Cubic Meter
ug/L	Micrograms per Liter
USC	United States Code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound
VTS	Vessel Traffic Service
WB	Westbound
WWTP	Wastewater Treatment Plant
YBI	Yerba Buena Island

APPENDIX E
CONSULTATION AND COORDINATION

APPENDIX E
CONSULTATION AND COORDINATION

This environmental document was prepared in consultation and coordination with various federal, state, and local agencies, organizations, and individuals of Bay Area communities. Agency consultation and public participation have been accomplished through a variety of formal and informal methods, including scoping meetings, a series of informal community open houses, responses to website letters requesting information, responses to e-mails, meetings with individual public agencies and interest groups, public hearings, and a series of informational newsletters. This section summarizes these activities.

PROJECT ORGANIZATION AND COMMITTEES

The Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans) are serving as joint lead agencies to prepare this Environmental Impact Statement/Statutory Exemption. The U.S. Coast Guard is a Cooperating Agency.

Project Development Team

A Project Development Team (PDT) was assembled by Caltrans to serve as a technical advisory committee to Caltrans' decision-makers. The PDT consists of representatives from affected agencies and meets periodically to address project issues requiring technical direction or resolution. Twelve PDT meetings have been held, the first on November 4, 1997, the most recent on March 1, 2001.

The following agencies and organizations have participated in the PDT:

Alameda -Contra Costa County (AC) Transit District	City of Oakland - Landmarks Preservation Advisory Board	City and County of San Francisco - Office of the Mayor	Public Utilities Commission - Treasure Island
Contra Costa Congestion Management Agency	Port of Oakland	City and County of San Francisco - Mayor's Office, TI Project Office	American Institute of Architects
East Bay Regional Park District	Port of San Francisco	City and County of San Francisco - Planning Department	California Highway Patrol
East Bay Municipal Utility District	San Francisco Bay Trail Project	Bay Area Council	Federal Highway Administration
Oakland Base Reuse Authority	San Francisco Bay Conservation and Development Commission	Bay Area Rapid Transit District	National Park Service
City of Oakland - Planning Department	San Francisco Transportation Authority	RIDES for Bay Area Commuters	U.S. Army
City of Oakland - Office of the Mayor	City and County of San Francisco - Department of Parking and Traffic	Regional Bicycle Advisory Committee	U.S. Coast Guard
City of Oakland - Public Works Agency	City and County of San Francisco - Department of Public Works	Metropolitan Transportation Commission	U.S Navy

Metropolitan Transportation Commission (MTC) Bay Bridge Design Task Force

Following the January 1997 recommendation from the Business, Transportation and Housing Agency to Governor Pete Wilson that consideration be given to replacement of the East Span, Bay Area legislators recommended that MTC coordinate local deliberations for the location, design, and funding strategies for amenities on a replacement structure. In February 1997, MTC formed the Bay Bridge Design Task Force to assist MTC in developing recommendations for bridge design options and amenities. The Task Force is comprised of seven MTC Commissioners.

The Task Force conducted a series of public meetings in April and May 1997 at which recommendations related to replacement alternatives were presented. The Task Force, with advice from its Engineering and Design Advisory Panel (see description following) and citizen and agency input, has adopted recommendations for the design and alignment of a replacement alternative. The Task Force adopted seventeen EDAP recommendations on July 23, 1997. These recommendations are:

1. The Commission should support a two-year extension of tolls and establish a priority for use of the estimated $230 million as follows: first, for the additional costs for a cable-supported structure; second, for a portion of the cost of the Transbay Transit Terminal; and third, a bicycle and pedestrian facility on the East Span of the bridge should continue to be evaluated through the 30% design stage.
2. Caltrans should select two design teams to develop the two cable-supported alternatives to approximately 30% design stage, so that reliable information as to seismic performance, cost, visual design, and other issues can be obtained before a final recommendation is made.
3. The EDAP and the Bay Bridge Design Task Force should remain in place through the 30% design stage of the project to make final recommendation on bridge design type and thereafter to provide continuous review of final design and engineering details.
4. The existing eastern span of the Bay Bridge should not be retrofitted, but replaced with a new structure.
5. The new eastern span and existing western span retrofit should be designed to provide post-earthquake "lifeline" service.
6. The new eastern span should have ten traffic lanes, five in each direction, with two standard 10' shoulders in each direction as part of its base cost.
7. The new eastern span does not require a dedicated bus/carpool lane. Caltrans' design should minimize weaving conflicts between high occupancy and other vehicles at the transition from the dedicated HOV approach lanes to the bridge itself.
8. The new eastern span should be designed in accordance with Caltrans' proposed design loading which will accommodate the possibility of future rail service.
9. The Yerba Buena Island ramps are an inherent part of the bridge, and Caltrans has the responsibility to replace the ramps in order to assure safe traffic flow on the bridge.
10. The new eastern span should be built in the northern adjacent alignment.
11. The new eastern span should have a cable-supported main span with a single vertical tower with single or multiple legs in the transverse direction and single or multiple places of supporting cables.

12. The new eastern span should not be double-decked. It should have two parallel separated decks on the causeway section and either parallel separated decks or a single deck on the cable-supported span.
13. The structural elements of the new eastern span should be visually consistent throughout.
14. The causeway section should have long, equal span lengths, although closer span lengths might be necessary just adjacent to the Oakland shore.
15. For the causeway section, particular attention should be paid to the design of the supporting pier as it enters the water, including the possibility of submerging the pile cap below water.
16. The cable or suspension tower on the eastern span should be no taller than the suspension towers on the existing western span.
17. The "diamond" shape for the tower base should not be employed in any cable or suspension tower on the eastern span.

On June 22, 1998, the MTC Task Force adopted four additional recommendations that either were new or replaced some of the original recommendations. These recommendations were needed to account for engineering feasibility information that had become available after the original recommendations were adopted in June 1997.

18. For the causeway section, the pile cap should be above the water.
19. The cable-supported portion of the new east spans of the Bay Bridge should be a single-tower self-anchored suspension span.
20. A constant-depth steel and variable-depth concrete skyway with at least 160-meter (525-foot) spans should be carried to bid.
21. One 4.7-meter (15.5-foot) bicycle/pedestrian path on the south side of the new bridge should be constructed as part of this project.

Caltrans has provided technical support to the MTC Task Force and its EDAP. MTC Bay Bridge Task Force recommendations have been considered in the development of alternatives for the East Span Seismic Safety Project. Replacement Alternative N-6 Self-Anchored Suspension Design Option with a bicycle/pedestrian path reflects the Task Force's recommendation.

MTC Bay Bridge Design Task Force Engineering and Design Advisory Panel (EDAP)

The MTC Bay Bridge Design Task Force assembled 36 technical experts in structural and civil engineering and architecture to form the EDAP. Panel members include academic and consulting industry professionals. Organizations represented on the EDAP include:

- American Institute of Architects;
- American Society of Civil Engineers;
- San Francisco Bay Conservation and Development Commission Design Review Board;
- San Francisco Bay Conservation and Development Commission Engineering Criteria Review Board;
- Caltrans Peer Review Panel;

- Caltrans San Francisco-Oakland Bay Bridge Review Panel;
- Caltrans Seismic Advisory Board; and
- Structural Engineers Association of Northern California.

The role of the EDAP is to provide expert technical analysis to the Task Force. In fulfilling this role, the EDAP has also conducted a series of public meetings at which bridge design concepts were reviewed. The Task Force recommendations (see previous section) were developed through EDAP deliberations.

Bicycle/Pedestrian Advisory Committee and the Elderly/Disabled Advisory Committee

When Governor Wilson announced that Caltrans would evaluate replacement of the East Span as a retrofit strategy, bicycle enthusiasts became active in the East Span Seismic Safety Project advocating installation of a bicycle/pedestrian lane or path in replacement alternatives. Over the ensuing months, several more bicycle, alternative transit, and public access groups began to advocate non-vehicular access on the East Span. Caltrans initially met with several of the approximately 40 participating groups. Several individuals from these groups formed a Bicycle/Pedestrian Advisory Committee (BPAC) to represent the interest of the numerous groups. During the course of this project, ten meetings have been held with the BPAC. Caltrans will continue to work with BPAC to address path design refinements such as signage, striping, and path furnishings.

The Elderly/Disabled Advisory Committee provides guidance to MTC and the bridge designers regarding accessibility and safety of a bicycle and pedestrian path for elderly and disabled path users. This group participates in the BPAC meetings and decision-making.

Oakland Gateway Planning Group

The Oakland Gateway Planning Group was established to coordinate actions in the Oakland Touchdown area. The group was formed following a request from the East Bay Regional Park District (EBRPD) to the San Francisco Bay Conservation and Development Commission (BCDC) that efforts to establish a shoreline park in the Oakland Touchdown area be coordinated with East Span Seismic Safety Project alternatives. The overall goal of the Planning Group is to have a master plan agreement that includes funding and designation of the agency which will be ultimately responsible for the proposed park.

Caltrans, as initial host of a series of planning meetings, invited the participation of representatives of BCDC, EBRPD, Port of Oakland, City of Oakland, Oakland Landmarks Preservation Advisory Board, Oakland Army Base Reuse Authority, National Park Service, and the Association of Bay Area Governments/Bay Trail.

As part of the planning efforts, East Span Project alternatives' development has included identification of planning constraints and investigation of gateway concepts at the Oakland Touchdown area to create a visually memorable East Bay arrival point when exiting the East Span. Gateway design concepts developed in coordination with the East Span Project have evolved in response to recommendations from planning

group members to expand the gateway concept to include land design concepts at the touchdown currently owned by Caltrans, Port of Oakland, and Oakland Army Base. EBRPD has taken the leadership role in hosting the planning meetings. In order for Caltrans land to become part of the park, it would need to be declared no longer needed for transportation purposes by Caltrans. Once this occurs, the land would revert to the Port of Oakland. Once under Port control, the Port could decide to transfer the land to EBRPD. Caltrans will continue to participate in planning efforts to create a gateway park.

AGENCIES CONTACTED

Agencies formally or informally consulted during the preparation of this environmental document include the following:

Advisory Council on Historic Preservation
Federal Transit Administration
National Marine Fisheries Service
National Park Service
U.S. Army
U.S. Army Corps of Engineers
U.S. Coast Guard
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Department of the Interior
U.S. Navy
Dredged Material Management Office
California Department of Fish and Game
California Highway Patrol
Native American Heritage Commission
San Francisco Bay Conservation and Development Commission
State Historic Preservation Office
State Lands Commission
Association of Bay Area Governments
East Bay Municipal Utility District
East Bay Regional Park District
Metropolitan Transportation Commission
Pacific Gas and Electric
Regional Water Quality Control Board - San Francisco Region
City of Oakland
City and County of San Francisco
Port of Oakland
Port of San Francisco

An extensive list of federal, state, and local agencies, organizations, and others received the Notice of Intent to prepare an EIS and the Draft EIS for review. This list has been revised for FEIS distribution and can be found in Appendix C.

KEY AGENCY MEETINGS

NEPA/404 Integration Memorandum of Understanding (MOU) Process

Caltrans and the Federal Highway Administration (FHWA) began consultation with federal agencies participating in the NEPA/404 MOU process in August 1997 (see Appendix F for explanation of the NEPA/404 MOU process). Under the MOU process, the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), U. S. Army Corps of Engineers (ACOE), U.S. Environmental Protection Agency (EPA), and the Federal Transit Administration (FTA) are asked to concur on the project purpose and need statement, criteria for alternative selection and range of alternatives to be considered. In addition, concurrence on the jurisdictional delineation of wetlands and compliance with Section 404(b)(1) is obtained. The EPA and ACOE concur on the Least Environmentally Damaging Practicable Alternative (LEDPA) and provide preliminary agreement on the conceptual mitigation for special aquatic sites; USFWS provides preliminary agreement on mitigation.

Several meetings regarding the project purpose and need were conducted. At the first three meetings, participants considered the seismic safety project's purpose and need statement, the range of alternatives proposed for evaluation, and the selection criteria. Following the meetings, written concurrence was received from each agency (see Appendix F).

Consistent with the NEPA/404 Integration MOU, Caltrans and FHWA have identified a Preferred Alternative (Replacement Alternative N-6); ACOE and EPA have identified that the Preferred Alternative is the Least Environmentally Damaging Practicable Alternative (LEDPA) pursuant to Section 404(b)(1) of the federal Clean Water Act. Subsequent actions under the NEPA/404 Integration MOU are the publication of this Final EIS by Caltrans and FHWA and notification and issuance of the Section 404 Individual Permit by the ACOE.

Other federal, state, and regional agencies with regulatory and permitting obligations for the East Span Project were invited to participate in the NEPA/404 MOU meetings. Participants included:

- U.S. Coast Guard;
- San Francisco Regional Water Quality Control Board;
- San Francisco Bay Conservation and Development Commission;
- California Department of Fish and Game; and
- Metropolitan Transportation Commission.

Consultation Pursuant to Section 106 of the National Historic Preservation Act

Background. In April 1997, several organizations were invited to submit comments on the East Span Project with respect to historic properties. These organizations included:

- American Society of Civil Engineers, History & Heritage Committee
- Berkeley Architectural Heritage Association
- California Preservation Foundation
- Foundation for San Francisco's Architectural Heritage
- National Trust for Historic Preservation, Western Regional Office
- Oakland Heritage Alliance
- Oakland Landmarks Preservation Advisory Board
- San Francisco Landmarks Preservation Advisory Board

In July 1997, Caltrans gave a presentation on the East Span Project to representatives of the Oakland Landmarks Preservation Advisory Board, Oakland Heritage Alliance, California Preservation Foundation, and San Francisco Landmarks Preservation Advisory Board. The Oakland Landmarks Preservation Advisory Board responded by letter on January 14, 1998, advocating that consideration be given to retrofitting of the existing bridge rather than replacing it, and suggesting several mitigation measures if a replacement alternative was selected.

On December 10, 1998, Caltrans held a meeting to which historic preservation organizations and local governments were invited, to discuss possible measures to mitigate project effects on historic properties. Representatives from the City of Oakland and its Landmarks Preservation Advisory Board, the Oakland Heritage Alliance, and the Port of Oakland attended.

On February 1, 1999, a representative from the Advisory Council on Historic Preservation (ACHP) toured the project area and the historic properties with representatives from Caltrans, FHWA, the Navy, the USCG, CCSF, and the SHPO. The following day, two meetings were held with invited historic preservation organizations and local governments, to further discuss project effects on historic properties and mitigation measures. The first meeting was attended by representatives of the City and County of San Francisco, California Preservation Foundation, National Park Service, Navy, USCG, FHWA, SHPO, and ACHP. This meeting included discussion of the replacement alternatives and their differing effects on Navy and Coast Guard facilities on Yerba Buena Island, as well as proposed measures to mitigate project effects on historic properties. The second meeting continued the discussion of measures to mitigate for the loss of the East Span of the Bay Bridge under the replacement alternatives, and was attended by representatives from the City of Oakland's Landmarks Board and Public Works Department, Port of Oakland, FHWA, SHPO, and ACHP.

An Addendum Finding of Adverse Effect Report and Consideration of Proposed Mitigation Measures were sent to the SHPO, ACHP, Navy, USCG, local governments, and other interested parties in October 1999. A draft Memorandum of Agreement (MOA) was also distributed for review and comment. Based on comments received, the MOA was revised and executed in May 2000, and circulated for concurring parties' signatures in May and June, 2000.

There are no federally recognized tribes in the vicinity of the project area; Caltrans therefore contacted the California Native American Heritage Commission to obtain a list of potentially interested Native American individuals and groups. In November 1997, Caltrans sent letters to the 14 individuals on this list, inviting their participation and comments concerning archaeological site CA-SFr-04/H on Yerba Buena Island. Mr. Tony Cerda responded by letter, asking to participate in the consultation concerning the treatment of this archaeological site. In addition, Ms. Jakki Kehl responded to Caltrans by phone with concerns about the Native American Graves Protection and Repatriation Act (NAGPRA) as it potentially relates to the treatment of this site.

The Archaeological Survey Report for CA-SFr-04/H was sent to the Native American Heritage Commission and the Native American monitor who was present during previous site excavations. Caltrans will submit a treatment plan for CA-SFr-04/H to all parties to the MOA and interested Native Americans for review, with the goal of soliciting early input on its development.

Chronology:

June 24, 1998	Copies of the Historic Property Survey Report (HPSR), including an Historic Architecture Survey Report and an Archaeological Survey Report were sent by Caltrans to the City and County of San Francisco, the Navy, and the USCG.
Aug. 13, 1998	SHPO review of the HPSR and response to FHWA: SHPO concurs with some of the document's conclusions and requests additional information.
Aug. 19, 1998	Caltrans letter to the SHPO, providing additional information requested in the SHPO's letter of August 13, 1998.
Aug. 21, 1998	SHPO response to Caltrans' letter of August 19, 1998, concurring with the conclusions of the HPSR.
Sept. 10, 1998	SHPO review of the Finding of Effect reports and response to FHWA: SHPO concurs that the undertaking will adversely affect historic properties.
Dec. 10, 1998	Meeting with Caltrans, City of Oakland, Port of Oakland, National Park Service and Oakland Heritage Alliance to discuss effects on historic properties and mitigation measures.
Jan. 19, 1999	Caltrans, FHWA, and SHPO staff met to discuss the proposed MOA.
Feb. 1, 1999	ACHP staff toured the project area and the historic properties, and discussed the project with Caltrans, FHWA, SHPO, the Navy, and the USCG.
Feb. 2, 1999	Meetings with Caltrans, FHWA, Navy, Coast Guard, SHPO, ACHP, City and County of San Francisco, City of Oakland, and California Preservation Foundation to discuss effects on historic properties and mitigation measures.
May 7, 1999	Caltrans sent letters to 14 individuals on a list provided by the Native American Heritage Commission, inviting their comment on the treatment of archaeological site CA-SFr-04/H on Yerba Buena Island.
May 14, 1999	Mr. Tony Cerda, Chairman of the Costanoan Rumsen Carmel Tribe, responded to Caltrans' letter of May 7, 1999. Mr. Cerda requested to participate in consultation concerning the treatment of the archaeological site on Yerba Buena Island. In addition, Ms. Jakki Kehl responded to Caltrans by telephone with concerns about the treatment of the site.
Oct. 14, 1999	"Addendum Finding of Adverse Effect" and "Consideration of Proposed Mitigation Measures" transmitted by Caltrans to the City and County of San Francisco, the City of Oakland, and Bay Area historic preservation groups.

Oct. 20-21, 1999	"Addendum Finding of Adverse Effect," "Consideration of Proposed Mitigation Measures" and proposed MOA transmitted by FHWA to the SHPO.
	"Finding of Adverse Effect," "Addendum Finding of Adverse Effect," "Consideration of Proposed Mitigation Measures," and proposed MOA transmitted by FHWA to ACHP, with copies to the Navy and USCG.
Oct. 27, 1999	"Phase I Archaeological Survey Report – Maritime Archaeology" for the Pile Installation Demonstration Project transmitted by FHWA to the SHPO.
Nov. 19, 1999	SHPO review of the Addendum Finding of Adverse Effect and response to FHWA: SHPO affirms earlier determination that all build alternatives will adversely affect historic properties.
Nov. 19, 1999	USCG response to FHWA requesting revisions to the MOA to make it clear that archaeological work will be carried out and funded by Caltrans.
Dec. 1, 1999	SHPO review of the maritime archaeology report for the Pile Installation Demonstration Project and response to FHWA: SHPO concurs that there are no maritime archaeological resources eligible for the NRHP in APE.
May 26, 2000	ACHP, FHWA, SHPO, and USCG execute MOA; Caltrans signs as concurring party.
June, 2000	The MOA was sent to the following parties for concurring signatures: U.S. Navy, City of Oakland, CCSF, and Native Americans.
June 6, 2000	The SHPO concurred with the Addendum Archaeological Survey Report's findings that there are no underwater historic properties in the Area of Potential Effect eligible for the NRHP.

Meetings with the City of Oakland and City and County of San Francisco

Meetings with the City of Oakland and the City and County of San Francisco have been held with agency directors, planning officials and others to discuss potential benefits and impacts of the project to each of the municipalities.

City of Oakland. Numerous meetings have been held with the Mayor's Office and staff from Planning, Economic Development, Landmarks Preservation Advisory Board, and Public Works divisions. City representatives have made presentations and comments at other public meetings, such as the MTC Bay Bridge Design Task Force EDAP. The City's key concerns are the aesthetic design of the East Span and the Oakland Touchdown area, mitigation for impacts to the historic existing East Span and

the potential for community involvement and employment during the construction phase.

City and County San Francisco. Numerous meetings have been held with various staff members, including the Mayor's Treasure Island Project Office, Planning, Traffic and Parking, and Public Works staff. The key concerns are alignment alternatives, land use, access impacts at Yerba Buena Island and Treasure Island, and detours and ramps on Yerba Buena Island.

NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

For projects that have the potential to substantially impact the environment, NEPA requires that an appropriate level of public involvement and environmental analysis take place. Major milestones in the NEPA process that were conducted or will be completed for the East Span Project include:

- A Notice of Intend (NOI) was published in the Federal Register on April 21, 1997. The NOI provided a description of the alternatives being considered and indicated that an EIS would be prepared;

- Scoping meetings were conducted in four Bay Area Counties (Alameda, Contra Costa, San Francisco, and Solano) in April and May 1997. These meetings allowed interested agencies, organizations, and individuals to help identify the environmental issues to be addressed in the DEIS;

- The DEIS was released for public circulation on September 24, 1998;

- The public review and comment period was 60 days and ended on November 23, 1998. Four public hearings were held in October 1998 during the review period, (see Chronology of Consultation and Coordination on page E-12), and written and verbal comments were received from agencies and the general public;

- Following consideration of all public and agency comments on the DEIS, Caltrans identified Replacement Alternative N-6 as the Preferred Alternative on December 28, 1998. FHWA identified Replacement Alternative N-6 as the Preferred Alterative in October 2000;

- This FEIS builds on the analyses reported in the DEIS by responding to comments received during the formal review period, updating the analyses, and defining plans to mitigate the project's adverse impacts; and

- The Record of Decision (ROD) will complete the NEPA environmental review process. The purpose of the ROD is to explain the reasons for the project decision, summarize any mitigation measures to be incorporated in the project, and document any required Section 4(f) approval.

PUBLIC INVOLVEMENT

In addition to the scoping process, public open houses, and public hearings, a variety of public participation activities have been conducted over the course of the engineering and environmental studies. The public has been encouraged to participate in the process by asking questions and making comments. Meetings were held with the general public and special interest groups. Public involvement activities are listed below followed by a brief description.

Scoping Meetings

MTC Bay Bridge Design Task Force meetings held in April and May 1997 allowed agencies and the general public the opportunity to provide input on alternatives and issues to be evaluated in the EIS. Meetings were held in Alameda, Contra Costa, San Francisco, and Solano counties. Three of the four meetings were publicly announced after publication of the Notice of Intent. Caltrans and FHWA used these three public meetings as scoping meetings pursuant to NEPA.

Environmental Organizations Meeting

In October 1997, Caltrans held a meeting with environmental interest groups in collaboration with the BCDC and the MTC. At the meeting, those present reviewed the project purpose and need, alternatives, and the environmental process and construction schedules. In addition, information was mailed out to several of the groups that did not attend.

Open Houses

A series of four public information open houses was provided to enable interested Bay Area residents to view the preliminary design concepts and obtain more information about the project. The open houses were held in Alameda, Contra Costa, and San Francisco Counties in December 1997, and in Solano County in March 1998, with approximately 300 people attending.

Public Hearings

Following distribution of the DEIS, Caltrans and FHWA held four public hearings to give the public an opportunity to learn more about the project and to discuss the project with Caltrans staff. A copy of the Draft EIS was available for viewing at each meeting. The hearings also provided opportunities for the public to submit formal comments on the project by providing written comments or by giving oral comments to a court reporter. These hearings were held in Alameda, Contra Costa, San Francisco, and Solano counties in October 1998. Approximately 174 people signed in as attending the hearings. Other people attended, but did not sign the attendance sheets.

Presentations

In addition to the meetings formally presented in this Appendix, presentations about the project have been made to various organized groups. These groups include:

Alameda County Congestion Management Agency
Alameda-Contra Costa Transit District
American Institute of Architects
American Public Works Association
American Society of Public Administrators
American Society of Civil Engineers
Association of Environmental Professionals
Association of General Contractors
Bank of America

Bay Area Municipal Forum
Bike the Bridge Coalition
Building Futures Council
California Land Surveyors Association
California League of Conservation Voters
California Preservation Foundation
California Retired Engineers
California Transportation Commission
Californians for Better Transportation
Consulting Engineers and Land Surveyors of California
Contra Costa County Council
Diablo Valley Lions Club
Emeryville City Council
Golden Gate Breakfast Club
Hercules Rotary Club
Institute of Electrical and Electronics Engineers
Institute of Transportation Engineers
International Right-of-Way Association
Joint Congestion Management Agency
Kiwanis Club of Walnut Creek
League of California Cities
Masonic Club
Oakland Chamber of Commerce
Oakland City Council
Oakland Landmarks Preservation Advisory Board
Oakland Rotary Club
Napa Engineers
North Bay Engineers Club
Peninsula Association of Contractors
Perry Street Residents
Piedmont City Council
Portland Concrete Cement Association
Retired Teachers Association
Rossmoor Engineers Club
San Francisco Chamber of Commerce
San Francisco Clock Tower Group
San Pablo Rotary Club
San Francisco Planning and Urban Research
Society of Professional Engineers
Sons in Retirement
South Bay Engineers
St. Paul's Towers
Structural Mechanics Association
West County Business and Professional Association
West Oakland Commerce Association
Western Council of Construction Consumers
Vacaville Rotary Club

Mailing List

A mailing list of interested parties has been compiled and contains approximately 3,500 names and addresses, including federal, state, and local agencies; elected and appointed officials; city and county staff persons; special interest groups; and the general public.

Newsletters

Four newsletters have been produced and distributed to the entire mailing list. These have described the study alternatives, process and schedule, announced the public meetings, and provided information about study progress and activities. Newsletters will continue to be produced and distributed periodically.

CHRONOLOGY OF CONSULTATION AND COORDINATION

Following is a chronology of key consultation and coordination events over the course of the studies leading to this document.

March 27, 1997, First MTC Bay Bridge Design Task Force meeting.

April 16, 1997, Opportunity for Scoping provided for interested agency staff and the general public at the MTC Bay Bridge Design Task Force meeting in Contra Costa County.

April 21,1997, A Notice of Intent was published in the Federal Register to announce the intent to prepare an EIS and provide a description of the alternatives being considered.

April 22, 1997, Opportunity for Scoping provided for interested agency staff and the general public at the MTC Bay Bridge Design Task Force meeting in Alameda County.

April 23, 1997, Opportunity for Scoping provided for interested agency staff and the general public at the MTC Bay Bridge Design Task Force meeting in Solano County.

May 8, 1997, Opportunity for Scoping provided for interested agency staff and the general public at the MTC Bay Bridge Design Task Force meeting in San Francisco County.

June 24, 1997, Second MTC Bay Bridge Design Task Force Meeting.

July 16, 1997, Third MTC Bay Bridge Design Task Force Meeting.

July 23, 1997, Fourth MTC Bay Bridge Design Task Force Meeting.

August 18, 1997, Formal letter request for listing of rare or endangered species to U.S. Fish and Wildlife Service; response dated on August 29, 1997.

September 9, 1997, First NEPA/404 integration meeting to discuss project purpose and need.

October 3, 1997, Environmental Organizations meeting.

October 7, 1997, Tour of Oakland Army Base property with the East Bay Regional Park District and Oakland Gateway Planning Group.

October 8, 1997, Fifth MTC Bay Bridge Design Task Force meeting.

October 23, 1997, Second NEPA/404 integration meeting to discuss project purpose and need.

October 24, 1997, First coordination meeting with the City of Oakland.

October 28, 1997, First coordination meeting with the City and County of San Francisco to discuss the Treasure Island Redevelopment Plan.

October 28, 1997, First meeting with the Bicycle/Pedestrian Advisory Committee.

October 30, 1997, Second meeting with the Oakland Gateway Planning Group.

November 4, 1997, First Project Development Team meeting.

November 12, 1997, Sixth MTC Bay Bridge Design Task Force meeting.

November 13, 1997, Third NEPA/404 integration meeting to discuss alternatives.

November 18, 1997, Third meeting with the Oakland Gateway Planning Group.

November 20, 1997, Second coordination meeting with the City and County of San Francisco.

December 8, 1997, Open House in Alameda County (Lake Merritt Sailboat House, Oakland).

December 9, 1997, Open House in Contra Costa County (JFK University Law School Auditorium, Walnut Creek).

December 11, 1997, Open House in San Francisco County (One Market Plaza, San Francisco).

December 16, 1997, Second meeting with the Bicycle/Pedestrian Advisory Committee.

January 14, 1998, Seventh MTC Bay Bridge Design Task Force meeting.

January 22, 1998, Third meeting with the Bicycle/Pedestrian Advisory Committee.

February 11, 1998, Eighth MTC Bay Bridge Design Task Force meeting.

February 17, 1998, Fourth meeting with the Bicycle/Pedestrian Advisory Committee.

February 18, 1998, Fourth meeting with the Oakland Gateway Planning Group.

February 18, 1998, Second coordination meeting with the City of Oakland.

March 4, 1998, Fifth meeting with the Bicycle/Pedestrian Advisory Committee.

March 25, 1998, Open House in Solano County (Solano Mall, Fairfield).

March 30, 1998, Third coordination meeting with City and County of San Francisco.

April 7, 1998, Second Project Development Team meeting.

April 8, 1998, Ninth MTC Bay Bridge Design Task Force meeting.

April 17, 1998, First coordination meeting with the U.S. Navy.

April 27, 1998, Fourth meeting with the City and County of San Francisco.

May 7, 1998, Third coordination meeting with the City of Oakland.

May 13, 1998, Tenth MTC Bay Bridge Design Task Force meeting.

May 20, 1998, Fifth meeting with the Oakland Gateway Planning Group.

June 8, 1999, Second coordination meeting with the U.S. Navy.

June 10, 1998, Eleventh MTC Bay Bridge Design Task Force meeting. Public hearing to review design alternatives and EDAP recommendations.

June 16, 1998, Fourth coordination meeting with the City of Oakland.

June 18, 1998, San Francisco Bay Conservation and Development Commission hearing and vote on policy issues of concern related to the Bay Bridge Project.

June 22, 1998, Twelfth MTC Bay Bridge Design Task Force meeting.

June 24, 1998, MTC adopted recommendations on bridge design and amenities and act on toll surcharge extension.

July 6, 1998, Third Project Development Team meeting.

July 7, 1998, Meeting with the City of Oakland to discuss mitigation measures for historic properties.

July 8, 1998, First meeting with the Dredged Material Management Office.

July 21, 1998, Tour of historic properties at the Oakland Touchdown area with the City of Oakland.

July 21, 1998, Third coordination meeting with the U.S. Navy.

July 22, 1998, Sixth meeting with the Oakland Gateway Planning Group.

July 23, 1998, Fifth coordination meeting with the City of Oakland.

August 3, 1998, First meeting with the U.S. Coast Guard.

August 19, 1998, Sixth meeting with the Bicycle/Pedestrian Advisory Committee.

August 25, 1998, Fourth coordination meeting with the U.S. Navy.

August 26, 1998, Meeting with the National Marine Fisheries regarding marine impacts.

September 24, 1998, DEIS distributed

September 29, 1998, Fourth Project Development Team meeting.

September 29, 1998, Sixth coordination meeting with the City of Oakland.

October 14, 1998, Thirteenth MTC Bay Bridge Design Task Force meeting.

October 14, 1998, Public Hearing in Alameda County (MTC, Oakland).

October 15, 1998, Public Hearing in San Francisco County (One Market Plaza, San Francisco).

October 20, 1998, Public Hearing in Contra Costa County (Contra Costa Christian High School, Walnut Creek).

October 22, 1998, Public Hearing in Solano County (John F. Kennedy Library, Vallejo).

November 13, 1998, Fifth meeting with the City and County of San Francisco.

December 2, 1998, Fifth Project Development Team meeting.

December 2, 1998, Seventh meeting with the Oakland Gateway Planning Group.

December 10, 1998, First Historic Resource Agency Consultation meeting.

December 22, 1998, Second meeting with the Dredged Material Management Office.

January 11, 1999, Second meeting with the National Marine Fisheries Service.

January 12, 1999, First meeting with the East Bay Municipal Utility District.

January 13, 1999, Fourteenth MTC Bay Bridge Design Task Force meeting.

January 20, 1999, Third meeting with the Dredged Material Management Office.

January 22, 1999, Second meeting with the U.S. Coast Guard.

January 22, 1999, Second meeting with the East Bay Municipal Utility District.

January 27, 1999, Eighth meeting with the Oakland Gateway Planning Group.

February 1, 1999, Coordination meeting and field review with Advisory Council on Historic Preservation.

February 2, 1999, Agency consultation meeting on historic resources.

February 10, 1999, Ninth meeting with the Oakland Gateway Planning Group.

February 23, 1999, Meeting with Golden Gate Audubon Society and California Department of Fish and Game about cormorant colony on existing bridge.

February 24, 1999, Fifteenth MTC Bay Bridge Design Task Force meeting.

March 16, 1999, Third meeting with the National Marine Fisheries Service.

March 22, 1999, Sixth meeting with the City and County of San Francisco.

March 24, 1999, Fourth meeting with the Dredged Material Management Office.

March 31, 1999, Meeting with the U.S. Environmental Protection Agency regarding dredged materials.

April 2, 1999, Seventh meeting with the Bicycle/Pedestrian Advisory Committee.

April 8, 1999, Sixth Project Development Team meeting.

April 29, 1999, Fourth meeting with the National Marine Fisheries Service.

April 30, 1999, Meeting with the San Francisco Fire Department.

May 12, 1999, Tenth meeting with the Oakland Gateway Planning Group.

June 10, 1999, Eight meeting with the Bicycle/Pedestrian Advisory Committee.

July 14, 1999, Sixteenth MTC Bay Bridge Design Task Force meeting.

July 21, 1999, Third meeting with the U.S. Coast Guard.

September 8, 1999, Seventeenth MTC Bay Bridge Design Task Force meeting.

September 16, 1999, Seventh Project Development Team meeting.

September 17, 1999, Meeting between MTC and East Bay Regional Park District regarding the Oakland Touchdown Park.

November 4, 1999, BCDC public meeting on solid fill at the Oakland Touchdown Area; advisory vote.

November 11, 1999, Meeting with FHWA, U.S. Army Corps of Engineers, and East Bay Municipal Utility District.

December 9, 1999, Ninth meeting with the Bicycle/Pedestrian Advisory Committee.

December 13, 1999, Meeting with FHWA and Navy regarding land use.

January 7, 2000, Meeting with FHWA and Navy regarding the EBMUD sewer outfall.

January 13, 2000, Eighth Project Development Team meeting.

January 19, 2000, Fifth meeting with the National Marine Fisheries Service.

March 1, 2000, Meeting with FHWA and Navy regarding Section 106 issues.

March 29, 2000, Seventh coordination meeting with the City of Oakland.

April 13, 2000, Ninth Project Development Team meeting.

May 10, 2000, First interagency meeting on special aquatic sites.

June 5, 2000, Tenth meeting with the Bicycle/Pedestrian Advisory Committee.

June 6, 2000, San Francisco Bay Conservation and Development Commission Engineering Criteria Review Board meeting.

June 26, 2000, Meeting with the East Bay Regional Park District regarding special aquatic sites.

July 10, 2000, San Francisco Bay Conservation and Development Commission Design Review Board meeting.

July 12, 2000, Second interagency meeting on special aquatic sites.

July 24, 2000, Meeting with San Francisco Bay Conservation and Development Commission staff.

August 7, 2000, San Francisco Bay Conservation and Development Commission Design Review Board.

August 9, 2000, Third interagency meeting on special aquatic sites.

August 30, 2000, Meeting with Oakland Base Reuse Authority regarding land use.

August 31, 2000, Tenth Project Development Team Meeting.

September 11, 2000, Meeting with San Francisco Bay Conservation and Development staff about the bicycle pedestrian pathway.

September 22, 2000, ACOE presentation of interim results of its study of retrofit versus replacement.

October 4, 2000, Meeting with EPA regarding project overview.

October 10, 2000, Meeting with the ACOE, EPA, FHWA, and Caltrans on the LEDPA.

October 27, 2000, ACOE presentation of final results of its study of retrofit versus replacement.

November 6, 2000, Interagency meeting on special aquatic sites.

November 6, 2000, San Francisco Bay Conservation and Development Commission Design Review Board.

November 8, 2000, Fourth interagency meeting on special aquatic sites.

November 27, 2000, Meeting with the ACOE, BCDC, and EPA on special aquatic sites.

November 30, 2000, Eleventh Project Development Team Meeting.

December 6, 2000, Meeting with the Regional Water Quality Control Board on special aquatic sites.

December 7, 2000, Meeting with the Engineering and Design Advisory Panel.

December 11, 2000, Meeting with USCG and CHP regarding property issues on YBI.

December 14, 2000, Meeting with Port of Oakland regarding right-of-way issues.

December 18, 2000, Meeting with Regional Water Quality Control Board on storm water management.

January 18, 2000, Meeting with Navy and CCSF regarding land conveyance issues on YBI.

January 24, 2001, Meeting with Navy and CCSF regarding utility issues.

February 2, 2001, Meeting with Oakland Base Reuse Authority regarding right-of-way issues.

February 6, 2001, Meeting with Port of Oakland regarding right-of-way issues.

February 15, 2001, Meeting with Port of Oakland regarding right-of-way issues.

February 21, 2001, FHWA met with Navy and EPA regarding land conveyance issues on YBI.

February 26, 2001, Meeting with EBMUD regarding issues affecting its outfall pipeline.

February 28, 2001, Meeting with Oakland Base Reuse Authority and Port of Oakland regarding right-of-way issues.

March 1, 2001, Twelfth Project Development Team Meeting.

March 14, 2001, Meeting with BCDC regarding permit coordination.

March 15, 2001, Meeting with FHWA, Navy, EPA, USCG, CCSF, DTSC and RWQCB regarding land conveyance issues on YBI.

March 16, 2001, Meeting with Port of Oakland regarding right-of-way issues.

PERMITS AND APPROVALS

The following permits and/or approvals are required from the respective agencies:

Agency	Approval or Permit
U.S. Army Corps of Engineers	• Grant permit pursuant to Section 404 of the Clean Water Act. • Permit discharge of dredged material in San Francisco Bay under Section 10 of the Rivers and Harbors Act of 1899, as amended. • Participate in the NEPA/404 Integration Process. • Grant permit pursuant to Section 102 of the Marine Protection, Research, and Sanctuaries Act for deep ocean disposal
U.S. Coast Guard	• Signatory to the Memorandum of Understanding pursuant to Section 106 of the National Historic Preservation Act. • Approve the location and placement of bridges under Section 9 of the 1899 Rivers and Harbors Act, as amended. • Approve bridge construction under the General Bridge Act of 1946.
U.S. Environmental Protection Agency	• Participate in the NEPA/404 Integration Process. • Participate in the process to regulate disposal of dredged material in ocean/bay waters • Review and comment on BCDC and ACOE permits. • Grant permit pursuant to Section 102 of the Marine Protection, Research, and Sanctuaries Act for deep ocean disposal
U.S. Fish and Wildlife Service	• Engage in consultation regarding potential impacts to sensitive species in accordance with Section 7 of the federal Endangered Species Act. • Review and comment on BCDC and ACOE permits. • Participate in the NEPA/404 Integration Process.
National Marine Fisheries Service	• Marine Mammal Protection Act authorizations. • Engage in consultation regarding potential impacts to sensitive species in accordance with Section 7 of the federal Endangered Species Act. • Engage in consultation regarding essential fish habitat. • Review and comment on BCDC and ACOE permits. • Participate in the NEPA/404 Integration Process.
Advisory Council on Historic Preservation	• Signatory to the Memorandum of Understanding pursuant to Section 106 of the National Historic Preservation Act.
Bay Conservation and Development Commission	• Approve a permit to place fill, extract materials or change the use of any land, water, or structure within its jurisdiction pursuant to the McAteer-Petris Act. • Participate in the process to regulate disposal of dredged material in ocean/bay waters. • Review and comment on ACOE permit. • Make a Finding of Consistency with the federal Coastal Zone Management Act.
California Department of Fish and Game	• Engage in consultation regarding sensitive species in accordance with the California Endangered Species Act. • Review and comment on BCDC and ACOE permits.
Port of Oakland and Port of San Francisco	• Grant drilling permits and property rights
Regional Water Quality Control Board	• Grant or waive a Water Quality Certificate pursuant to Section 401 of the Clean Water Act. • Verify that the Storm Water Pollution Prevention Plan demonstrates compliance with the existing National Pollutant Discharge Elimination System Permit. • Participate in the process to regulate disposal of dredged material in ocean/bay waters. • Review and comment on BCDC and ACOE permits.
State Historic Preservation Officer	• Signatory to the Memorandum of Understanding pursuant to Section 106 of the National Historic Preservation Act.
Dredged Material Management Office (DMMO) (consisting of the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the San Francisco Bay Conservation and Development Commission, the Regional Water Quality Board, and the State Lands Commission)	• Determine the suitability of dredged materials for unconfined aquatic disposal; recommended appropriate disposal site(s) to its member agencies.

APPENDIX F

NEPA/404 INTEGRATION PROCESS

APPENDIX F
NEPA/404 INTEGRATION PROCESS

In May 1992, the U.S. Department of Transportation, the U.S. Department of Army-Civil Works, and the U.S. Environmental Protection Agency (EPA) adopted an agency policy to improve interagency coordination and to integrate National Environmental Policy Act (NEPA) and Clean Water Act Section 404 procedures. A Memorandum of Understanding (MOU) was developed for Arizona, California, and Nevada that specifies how these states will implement the agency policy. The Western States MOU applies to all projects needing both Federal Highway Administration (FHWA)/Federal Transit Administration (FTA) action under NEPA and a U.S. Army Corps of Engineers (ACOE) individual permit under Section 404 of the Clean Water Act.

Under the MOU process, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Federal transit Administration (FTA), ACOE and EPA are asked to concur on the project purpose and need statement, criteria for alternative selection and range of alternatives to be considered. ACOE also verifies the delineation of jurisdictional wetlands. The MOU process also incorporates analysis of the project pursuant to 404(b)(1) of the Clean Water Act. Prior to release of the Final Environmental Impact Statement (FEIS), ACOE, EPA and USFWS are asked to provide preliminary agreement on conceptual mitigation for unavoidable impacts to special aquatic sites. ACOE and EPA are also asked to provide preliminary agreement on the Least Environmentally Damaging Practicable Alternative (LEDPA) pursuant to the Clean Water Act.

The goal of the MOU is to have regulatory agencies participate in the project early in its planning and to have decisions made once for each stage of the process in order to expedite matters. Regulatory agencies are to provide comments in a timely manner and are to provide written concurrence that information to date is adequate for a particular stage and that the project may proceed to the next stage. Agencies do not revisit previous concurrences unless there is significant new information or a significant change to the project, the environment, or laws and regulations. Agencies agree to attempt to resolve issues causing nonconcurrence and to try to do so informally before entering formal dispute resolution.

Consultation was initiated for the East Span Project with the ACOE, EPA, FTA, USFWS, and NMFS in accordance with the Western States MOU. A project overview and a preliminary project Purpose and Need Statement were presented to the federal agencies at the September 9, 1997 NEPA/404 Kick-off Meeting. A second Integration meeting was held on October 23, 1997. At this meeting, Purpose and Need Statement discussions continued, and an overview of the conceptual range of alternatives and design variations was presented. A third meeting was conducted on November 13, 1997, to continue the NEPA/404 Integration MOU process and finalize the criteria for alternative selection and range of alternatives.

Comments on the Purpose and Need Statement were received, and the statement was revised accordingly. Additional meetings with the ACOE and the EPA were held to gain

a greater understanding of the agencies' comments. After the revisions were made, letters of concurrence were received from the federal agencies. The agencies also provided written concurrence (letters follow) with the criteria for alternative selection and the range of alternatives being included in the Environmental Impact Statement for the East Span Project. Consistent with the NEPA/404 Integration MOU, Caltrans and FHWA have identified a Preferred Alternative (Replacement Alternative N-6), and the EPA and ACOE have identified the Least Environmentally Damaging Practicable Alternative (LEDPA) as Replacement Alternative N-6.

The East Span Project requires a separate permit under Section 404 of the Clean Water Act for the discharge of fill and dredged materials into Waters of the U.S. According to Section 404 guidelines, projects involving several alternatives require an analysis of the alternatives to determine which is the LEDPA. Generally, this is the practicable alternative that either avoids Waters of the U.S. or impacts the smallest areas of waters, but exceptions can occur as a result of the alternatives analysis process. When conducting the process, The EPA and ACOE are to consider a wider range of environmental factors, such as Section 4(f) and Section 106 resources to determine which alternative would result in the least overall environmental harm.

A meeting was held on October 10, 2000 with ACOE, EPA, and USCG in which FHWA and Caltrans made a presentation to ACOE and EPA about the LEDPA. ACOE and EPA asked Caltrans to respond to several technical questions regarding environmental impacts and project design. Caltrans subsequently provided the agencies with responses to the questions that had been raised. In February and March 2001, ACOE identified Replacement Alternative N-6 as the LEDPA. The EPA identified Replacement Alternative N-6 as the LEDPA in March 2001.

Subsequent actions under the NEPA/404 Integration MOU will be the publication of this Final EIS by Caltrans and FHWA and notification and issuance of the Section 404 Individual Permit by the ACOE.

Other federal, state, and regional agencies with regulatory and permitting obligations for the East Span Seismic Safety Project were also invited to participate in the NEPA/404 MOU meetings. Participants included:

- U.S. Coast Guard;
- San Francisco Regional Water Quality Control Board;
- San Francisco Bay Conservation and Development Commission;
- California Department of Fish and Game; and
- Metropolitan Transportation Commission.

List of Letters

Date	From	To	Subject
9/12/1997	San Francisco Bay Conservation and Development Commissions	Caltrans	Purpose and Need Statement
9/18/1997	Caltrans	San Francisco Bay Conservation and Development Commission	Purpose and Need Statement
9/26/1997	Caltrans	NEPA/404 Participants	Purpose and Need Statement
10/9/1997	San Francisco Bay Conservation and Development Commission	Caltrans	Purpose and Need Statement
10/23/1997	U.S. Coast Guard	Caltrans	Purpose and Need Statement
11/26/1997	U.S. EPA	Caltrans	Purpose and Need Statement
12/17/1997	U.S. Fish and Wildlife Service	Caltrans	Purpose and Need Statement
12/23/1997	Caltrans	U.S. EPA	Purpose and Need Statement
1/21/1998	Federal Transit Administration	Caltrans	Purpose and Need Statement
1/26/1998	Caltrans	U.S. Army Corps of Engineers	Purpose and Need Statement
1/26/1998	National Marine Fisheries Service	Caltrans	Purpose and Need Statement
1/29/1998	U.S. Environmental Protection Agency	Caltrans	Purpose and Need Statement
2/13/1998	U.S. Army Corps of Engineers	Caltrans	Purpose and Need Statement
2/17/1998	Caltrans	NEPA/404 Participant	Range of alternatives; selection criteria
3/17/1998	U.S. Fish and Wildlife Service	Caltrans	Range of alternatives; selection criteria
4/2/1998	National Marine Fisheries Service	Caltrans	Range of alternatives; selection criteria
4/6/1998	U.S. Environmental Protection Agency	Caltrans	Range of alternatives; selection criteria
5/15/1998	Federal Transit Administration	Caltrans	Range of alternatives; selection criteria
5/22/1998	Caltrans	U.S. Army Corps of Engineers	Illustration of alignment alternatives
6/4/1998	U.S. Army Corps of Engineers	Caltrans	Range of alternatives; selection criteria

Date	From	To	Subject
8/7/1998	Caltrans	U.S. Coast Guard	Replacement alternatives and ADEIS
8/7/1998	Caltrans	U.S. Fish and Wildlife Service	Replacement alternatives and ADEIS
8/20/1998	U.S. Army Corps of Engineers	Caltrans	Review of new alternatives
8/27/1998	Caltrans	U.S. Army Corps of Engineers	Review of new alternatives
9/1/1998	U.S. Fish and Wildlife Service	Caltrans	ADEIS review
9/3/1998	U.S. Army Corps of Engineers	Caltrans	Review of new alternatives
9/1998	U.S. Army Corps of Engineers	Caltrans	Corps of Engineers jurisdiction
1/22/2001	U.S. Fish and Wildlife Service	Caltrans	Conceptual Mitigation Plan for Special Aquatic Sites
2/12/2001	U.S. Army Corps of Engineers	Caltrans	LEDPA and Conceptual Mitigation Plan for Special Aquatic Sites
3/15/2001	U.S. Environmental Protection Agency	Caltrans	Preliminary agreement on LEDPA and Conceptual Mitigation Plan for Special Aquatic Sites.

STATE OF CALIFORNIA — PETE WILSON, *Governor*

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
THIRTY VAN NESS AVENUE, SUITE 2011
SAN FRANCISCO, CALIFORNIA 94102-6080
PHONE: (415) 557-3686

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 1
To Mike Davis	From Mara Melandry
Co. P.B.Q + D., Inc	Co. Caltrans D4
Dept.	Phone # 510-286-5582
Fax # 415-243-9501	Fax # 510-286-6374

September 12, 1997

California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

ATTENTION: Ms. Mara Melandry, Environmental Manager

SUBJECT: **Review of the NEPA/404 Need and Purpose Statements for the San Francisco-Oakland Bay Bridge Replacement Project**

Ladies and Gentlemen:

I was unable to attend the NEPA/404 kick-off meeting, but would like to comment on the *Proposed Need and Purpose Statements* you submitted for our review. We concur with the Proposed Need Statement, but would like to recommend that the Proposed Purpose Statement be revised to remove the word "vehicular" from the first sentence of the statement.

It is our understanding that an alternative which includes the construction of a bicycle/pedestrian lane across the west crossing of the Bay Bridge will be evaluated in detail in the Environmental Impact Statement. We are concerned that this alternative may not be given full consideration simply because it would not meet your proposed purpose statement.

If you have any questions or would like to discuss this issue, please call me at (415) 557-8767.

Sincerely,

STEVEN A. McADAM
Deputy Director

SAM/CF/ra

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

September 18, 1997

Steve McAdam, Deputy Director
San Francisco Bay Conservation & Development Commission
30 Van Ness, Suite 2011
San Francisco, CA 94102-6080

Dear Mr. McAdam:

Thank you for your letter of September 12, 1997 regarding the purpose and need statement for the East Span Seismic Safety Project on the SFOBB. We will consider them in completing the purpose and need statement. Please note that the inclusion of the word vehicular in the statement does not preclude consideration of a bike/pedestrian lane across the bridge.

You also commented that you understood an alternative which includes a bike/pedestrian lane on the west span of the Bay Bridge will be evaluated in the EIS. We assume you meant the east span. A bike/pedestrian lane on the east span will not be evaluated as a separate alternative in the EIS for the East Span Seismic Safety Project. However, a bike/pedestrian lane on the east span will be discussed in the modal analysis portion of the EIS. A bike/pedestrian lane on the west span of the Bay Bridge could become a separate project in the future if there is legislative and public support for such an undertaking.

I hope this information clarifies the status of the bike/pedestrian lane.

If you have any questions, please call Mara Melandry, Environmental Manager for the Bay Bridge, at 510-286-5582.

Sincerely,

HARRY Y. YAHATA
District Director

By Denis Mulligan

DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

STATE OF CALIFORNIA—BUSINESS, TRANSPORTA. .N AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
23660
AND, CA 94623-0660
) 286-4444
TDD (510) 286-4454

COPY

September 26, 1997

Ala/SF 80
01200K

Dear NEPA/404 Agency Participant:

Thank you for participating in the September 9, 1997 NEPA/404 MOU Integration meeting for the SFOBB East Span Seismic Safety Project. Your comments concerning the draft project Purpose and Need Statement are greatly appreciated. The draft chapter of the environmental impact statement (EIS) on Purpose and Need will be submitted to you in advance of document circulation for your review and comment.

The enclosed summary of the Purpose and Need Statement has been edited in response to comments received at the September 9, 1997 meeting. Each comment received has been carefully considered. Please note two issues which were raised that require further discussion by NEPA/404 MOU participants.

1. The Draft Purpose Statement includes a reference to a "vehicular" connection between Yerba Buena Island and the SFOBB Toll Plaza in Oakland. It was suggested that the term "vehicular" be eliminated. The intention of this revision was understood in the context of not limiting how the bridge would be used in the recovery period following a maximum credible earthquake (MCE). However, in the larger context of seismic safety during a MCE and emergency response following a major event, Caltrans recommends that the intention to replace a 10-lane vehicular structure with a like facility be clearly stated in the project purpose statement. Various planning agencies in the Bay Area have prepared emergency response scenarios and plans; all have indicated that the bridge would operate as a vehicular connection in the aftermath of a major seismic event. For this reason, Caltrans believes that "vehicular" needs to be retained in the statement.

The EIS will provide supporting discussion of the vehicular connection and will also address the feasibility and effectiveness of multi-modal usage of the bridge.

Therefore, we request your concurrence in retaining the use of the word "vehicular" in the statement. Additional clarification of how the project would be used in the recovery period following a MCE and identification of multi-modal opportunities created by retrofit or replacement of the existing East Span will be provided in the EIS Purpose and Need Chapter.

2. It was suggested that the discussion of FHWA requirements concerning current traffic operations and safety design standards for the bridge replacement alternatives was inferred and need not be included in the summary Purpose statement. As will become clear to

participants in our upcoming discussion of the range of alternatives under consideration for the project, attaining current design standards may influence alignment and project footprint. Additionally, operational and safety standards are an inherent part of purpose and need for any project involving new construction. The project Purpose Statement should clearly support the need to meet the current safety and operational standards, even at the cost of potential impacts that might be avoided by relaxing current standards.

Your concurrence is requested in retaining a reference to operational and safety standards in the Project purpose statement.

Additional recommendations discussed at the meeting are documented in the meeting minutes that will be distributed to you under separate cover.

The enclosed matrix is provided in response to a request at the September 9 meeting. The matrix summarizes regulatory and permitting requirements that apply to the SFOBB East Span Seismic Safety Project.

Thank you for your continuing, active participation in the East Span Seismic Safety Project NEPA/404 Integration MOU process. I will be contacting you to discuss the proposed revisions to the Purpose and Need Statement and discuss the schedule for obtaining your agency's written concurrence. If you have questions or need additional information, please contact Mara Melandry, Environmental Manager for the East Span Seismic Retrofit Project, at 510/286-5582.

Sincerely,

HARRY Y. YAHATA
District Director

by

DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

c: Congressman George Miller
c/o Kathy Hoffman

Enclosures

STATE OF CALIFORNIA PETE WILSON, Governor

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
THIRTY VAN NESS AVENUE, SUITE 2011
SAN FRANCISCO, CALIFORNIA 94102-6080
PHONE: (415) 557-3686

October 9, 1997

California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

DJM

ATTENTION: Mr. Denis J. Mulligan, District Division Chief

SUBJECT: **Review of the NEPA/404 Need and Purpose Statements for the San Francisco-Oakland Bay Bridge Replacement Project**

Ladies and Gentlemen:

Thank you for your letter dated September 26, 1997 requesting our concurrence in retaining the use of the word "vehicular" and a reference to operational and safety standards in the Project Purpose Statement.

As previously stated in my letter dated September 12, 1997 addressed to Ms. Mara Melandry, we request that the proposed Purpose Statement be revised to remove the word "vehicular" from the first sentence of the statement. We have reviewed the Purpose and Need Statements for the Carquinez and the Benicia Martinez Bridges and neither statement includes the word "vehicular." We have also consulted a documented titled "Guidance Papers to facilitate the Implementation of the Memorandum of Understanding for the NEPA and Section 404 Integration Process", which states, in part, that the Purpose and Need Statement "...provides the basis for selecting reasonable and practicable alternatives for consideration; analyzing those alternatives in depth; and is an important factor in selecting the preferred alternative." Our concern is that the inclusion of the word "vehicular" could be construed as a predisposition to exclude or not adequately consider the potential for other transportation modes. In accordance with the Guidance Papers, we believe that the purpose of the project should be "broad enough to allow consideration of a full range of alternative ways to meet the defined need."

We do concur, however, in retaining the reference to the operational and safety standards in the Project Purpose Statement.

If you have any questions or would like to discuss this issue, please call me at (415) 557-8767.

Sincerely,

STEVEN A. McADAM
Deputy Director

SAM/CF/ra

U.S. Department of Transportation
United States Coast Guard

Commander (Pow-2)
Eleventh Coast Guard District

Bldg. 50-6
Coast Guard Island
Alameda, CA 94501-5100
Phone: (510)437-3514
FAX: (510)437-5836

16591
Ser: Pow 543-97
San Francisco Bay (8.9)
October 23, 1997

Mr. Denis Mulligan
District Division Chief, Toll Bridge Program
California Department of Transportation, District 04
Box 23660
Oakland, CA 94623-0660

Dear Mr. Mulligan:

Thank you for your letter of September 26, 1997 requesting Coast Guard concurrence with the draft project Purpose and Need Statement. As cooperating agency with the Federal Highway Administration for the new East San Francisco-Oakland Bay Bridge, the Coast Guard concurs with your purpose and need statement, and with retention of the word "vehicular" therein. We also concur with retaining reference to operational and safety standards in the Project purpose statement. We caution, however, that if pier placement is influenced by alignment changes necessary to satisfy these operational and safety standards, the piers be aligned to "mirror" the existing east San Francisco Oakland Bay Bridge span piers. Our request that the new piers mirror the existing piers was stated at the September 9 NEPA/404 Kick-Off Meeting, and was referenced in the CalTrans' minutes to the meeting received in our office on October 14, 1997.

The minutes also confirmed that a Coast Guard Section 9 bridge permit under the 1899 Rivers and Harbors Act, as amended, would be required. CalTrans had indicated in the minutes that retrofitting these piers for alternative uses does not seem feasible; the Coast Guard bridge permit will accordingly require that they be removed to the mud line, or to a level requested by the U.S. Army Corps of Engineers. Despite the environmental and engineering challenges involved with their removal, the requested removal is also consistent with BCDC policies, and is a standard consideration in Coast Guard Section 9 bridge permits.

I endorse Mr. Jerry Olmes' suggestion at the kickoff meeting that, in consideration with the Section 9 permit, the Coast Guard would coordinate issuance of a joint Section 404 public notice with the U.S. Army Corps of Engineers. I also agree with his expectation that no marine operations study would be needed to address marine impacts during construction of the new bridge, or removal of the existing bridge since most large commercial vessel traffic passes beneath the west Bay Bridge span. In addition, our Marine Safety Office San Francisco (MSO) would prepare a pre-construction checklist to address information the Coast Guard will need to advise marine interests of in our Local Notice to Mariners when the bridge is built. Our development of the checklist would not occur, however, until after the Section 9 permit is issued.

Our Coast Guard Vessel Traffic Service (VTS) has confirmed that the tower constructed as part of the new single-tower cable-stayed bridge or single-tower self-anchored suspension bridge will not adversely affect operation of their radar systems.

Please do not hesitate to contact Jerry or me at (510) 437-3514 if we may offer any comments or answer any questions.

Sincerely,

W.R. TILL
Chief, Bridge Section
U.S. Coast Guard
By direction of the District Commander

Copy: FHWA
BCDC
U.S. Army Corps of Engineers
Coast Guard MSO San Francisco
Coast Guard VTS San Francisco

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

November 26, 1997

Denis J. Mulligan
District Division Chief
Toll Bridge Program
California Department of Transportation
P.O. Box 23660
Oakland, CA 94623-0660

Dear Mr. Mulligan:

We are writing this letter to request additional information necessary for EPA to concur on the Purpose and Need Statement for the San Francisco-Oakland Bay Bridge (SFOBB) Retrofit project. Pursuant to the NEPA/404 Memorandum of Understanding (MOU), FHWA sent us a letter requesting concurrence on the purpose and need statement (statement dated October 30, 1997). As you know, our staff has been regularly attending the NEPA-404 meetings discussing the SFOBB Retrofit project. We have requested this additional information from the Caltrans staff at the last two meetings (10/23/97 and 11/13/97) and have yet to receive a response to our requests. At this point, we still do not feel that EPA has sufficient information to make a determination about whether to concur on the proposed Purpose & Need statement. Below is a specific description of the information we will need to make a determination about Purpose & Need.

Our major concern with the proposed Purpose and Need statement is that the specific definition of, and objectives for, maintaining a "life line connection" is unclear. Is the intent of a lifeline connection to allow the SFOBB to operate at existing LOS after an earthquake until other necessary repairs to the infrastructure are completed, estimated at 6 months to five years, and how would FHWA accomplish this? The overall intent of the life line connection should, we believe, correspond to the regional needs expected after a major earthquake occurs. The expected time frame for the SFOBB to maintain a reasonable connection as a "life line connection" as well as the regional needs of the SFOBB after a major earthquake should be incorporated, and/or explained as part of the definition of this term.

We also requested information on whether the San Francisco/East Bay Ferry Service and/or the BART trains are can provide or are being retrofitted to provide a lifeline connection after a Maximum Credible Earthquake (MCE). While we realize that Caltrans and FHWA are not responsible for ensuring that those facilities can withstand an MCE, we are concerned that if those systems are not operational after a MCE then the SFOBB will become an even more essential component for allowing movement of people across the Bay. Therefore, if BART and the Ferry Services are NOT expected to be operational after a MCE, we would expect that the Bay Bridge would be seriously affected in its level of service and fail to serve as a functional transportation

corridor, similarly as it was during the recent BART strike. If, on the other hand, one or both of those services are to be operational, we would anticipate a reduced and more manageable demand on the Bay Bridge. Therefore, information on these two key components of the regional transportation network is crucial to determining the definition of a "lifeline connection" and subsequent alternatives for meeting that standard.

Finally, as requested in earlier meetings, we will need to see a draft of the actual text for the Purpose and Need statement (with subsequent clarification of a "lifeline connection") before we can make a determination about the purpose and need statement. We feel that the overhead bullets provided and discussed at the interagency are useful in fostering discussion about the pertinent issues but are not sufficient for our needs as a concurring agency. We look forward to reviewing the full text of the proposed Purpose & Need statement.

Please refer to the October 23, 1997 meeting minutes for further clarification on the issues that we have raised. Also, since we have yet to receive this information that had been previously requested, we ask that Caltrans and FHWA allow us to provide our response and/or concurrence one month after receipt of the requested material. Should you have any questions about this issue you may contact me at (415) 744-1577.

Sincerely,

David J. Carlson
Life Scientist, Federal Activities Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:

PPN 2419

December 17, 1997

DJM

Denis J. Mulligan
District Division Chief
State of California Department of Transportation
Box 23660
Oakland, Ca 94623-0660

Subject: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, NEPA/404 Integration, San Francisco Bay, City of Oakland, San Francisco and Alameda Counties, California

Dear Mr. Mulligan:

This letter is in response to a October 30, 1997, California Department of Transportation (Caltrans) request for the U.S. Fish and Wildlife Service's (Service) concurrence with the Purpose and Need Statement of the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. Our response is made pursuant to the 1994 Memorandum of Understanding on Integration of the National Environmental Policy Act and Clean Water Act Section 404 Procedures for Surface Transportation Projects and is not intended to take the place of any formal comments that may be required under the Fish and Wildlife Coordination Act or the Endangered Species Act of 1973 as amended.

The Service has reviewed information provided by Caltrans concerning this project and concurs with the Purpose and Need for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project.

If you have any questions concerning the Service's comments on this project, please contact Mark Littlefield (Wetlands Branch) at (916) 979-2113.

Sincerely,

Wayne S. White
Field Supervisor

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, *Governor*

DEPARTMENT OF TRANSPORTATION
P.O. BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

December 23, 1997

File: 04-SF-80-7.6/8.9
04-Ala-80-0.00/1.3
SFOBB
East Span Seismic Safety Project

David Carlson
Federal Activities Office
United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105-3901

Dear Mr. Carlson:

As you requested in your letter of November 26, 1997, we are providing the draft purpose and need statement regarding the East Span Seismic Safety Project. As you further requested, Dan Harris and Bill Wong of FHWA have reviewed the draft statement; it reflects their comments.

The goal of providing the draft statement is to give you the background information in order for you to concur on purpose and need as set forth in the NEPA/404 MOU. The NEPA/404 MOU requires EPA to concur on purpose and need and does not require EPA to review and concur with the draft statement. The statement includes the definition and objectives of maintaining a lifeline vehicular connection and will answer your questions about this issue. As explained in the draft purpose and need statement, the bridge (after retrofitting to lifeline standards) will be immediately serviceable in the event of a maximum credible earthquake (MCE). We believe that the definition of lifeline is clear and needs no further discussion for your concurrence beyond what is provided by the draft purpose and need statement.

The information in the attachment addresses your request for information on BART and ferries after an MCE. Although BART and the ferries' emergency preparedness are a regional planning matter, outside the purview of both Caltrans and EPA, we trust the information will be useful to you in concurring with the purpose and need of the project. You will note that both these transportation modes are prepared to carry people to and from their jobs or other destinations following an MCE. There will be additional information in the environmental document about the Bay Area's overall response to an MCE and the responsibilities of the numerous public agencies that would be involved in responding to such an event.

In your letter you indicated EPA believed that the bridge was not functional during the recent BART strike because of increased demand, thus leading to your conclusion that it might not function if BART were inoperable after an MCE. It is Caltrans' estimation that the level of service (LOS) after an MCE would be low if BART and the ferries were not operating, which will not be the case; however, the bridge would indeed still allow movement of freight, goods and people across the Bay. In other words, it would still function.

We agree that you have 30 days to concur with the purpose and need of the project. We strongly believe that we have provided all the necessary information for EPA to do so within the 30-day time frame.

If you have any questions, please call Mara Melandry at (510) 286-5582.

Sincerely,

HARRY Y. YAHATA
District Director

by Denis Mulligan

DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

Enclosures

c: Vicki Alvarez (U. S. Army Corps of Engineers)
Becky Tuden (U. S. Environmental Protection Agency)
Donna Turci (Federal Transit Administration)
Mark Littlefield (U. S. Fish and Wildlife Service)
Jerry Olmes (U. S. Coast Guard)
Chris Mobley (National Marine Fisheries Service)
Becky Ota (California Department of Fish and Game)
Congressman George Miller

bc: JSchultz/BWong (FHWA – Calif. Division, Sacramento)
DHarris (FHWA – Region IX, San Francisco)
DMulligan
BMaroney
TAnziano (Caltrans Legal – SF)
SHulsebus/PChongchaikit
MMelandry/MMortenson
CAdams (HQ Envir. Division)
[redacted]
File

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION IX
Arizona, California,
Hawaii, Nevada, Guam

201 Mission Street
Suite 2210
San Francisco, CA 94105
415-744-3133
415-744-2726 (fax)

JAN 21 1998

Mr. Dennis J. Mulligan
District Division Chief
Toll Bridge Program
California Department of Transportation
Box 23660
Oakland, CA 92623-0660

Re: Draft Purpose and Need Statement (CONCURRANCE)
East Span Seismic Safety Project

Dear Mr. Mulligan:

The Federal Transit Administration (FTA) has received your letter of December 23, 1997, transmitting the draft purpose and need statement for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. FTA has reviewed it and concurs with the draft statement.

If you should have any questions, please call Mrs. Donna Turchie, Transportation Representative, at (415) 744-3115.

Sincerely,

Robert Hom, Director
Office of Planning & Program Development

cc: Mara Melandry
Environmental Planning-D4
California Department of Transportation
Box 23660
Oakland, CA 92623-0660

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
LAND, CA 94623-0660
286-4444
TDD (510) 286-4454

January 26, 1998

Ms. Victoria Alvarez
Caltrans Liaison
Regulatory Branch
United States Army Corps of Engineers
333 Market Street
San Francisco, California 94105-2197

File: 04-SF-80-7.6/8.9
04-ALA-80-0.00/1.3
04228-01200K
SFOBB
East Span Seismic Safety Project

Dear Ms. Alvarez:

Subject: SFOBB East Span Seismic Safety Project – NEPA/404 Concurrence

Enclosed is the draft purpose and need statement for the East Span Seismic Safety Project. It was previously sent to the Environmental Protection Agency on December 23, 1997, with copies sent to the Army Corps of Engineers and each of the other NEPA/404 MOU signatories.

Per your request, we are addressing this request directly to the Army Corps of Engineers to enable you to respond. Please review the enclosed materials as necessary and provide your final concurrence on purpose and need as set forth in the NEPA/404 MOU concurrence. In keeping with the decision of the NEPA/404 signatories in our meetings, we appreciate your willingness to concur on purpose and need before we request concurrence on alternatives and criteria for alternative selection. We appreciate your expeditious efforts in this matter.

If you have any questions. please call Mara Melandry at (510) 286-5582.

Sincerely,

HARRY Y. YAHATA
District Director

by

Mara Melandry

for DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

c: Becky Tuden (U. S. Environmental Protection Agency), Dave Carlson (U. S. Environmental Protection Agency), Donna Turci (Federal Transit Administration), Mark Littlefield (U. S. Fish and Wildlife Service), Chris Mobley (National Marine Fisheries Service), Jerry Olmes (U. S. Coast Guard), Becky Ota (California Department of Fish and Game), Congressman George Miller

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-6528

January 26, 1998 F/SW022:CTM

Ms. Mara Melandry
Senior Environmental Planner
CalTrans District 4
111 Grand Avenue
P.O. Box 23660
Oakland, California 94623-0660

Dear Ms. Malandry:

Thank you for the opportunity to comment on the December 19, 1997, draft project purpose and need statements for the *San Francisco-Oakland Bay Bridge East Span Seismic Safety Project*. I do not have any objections to these purpose and need statements.

I look forward to reviewing future National Environmental Policy Act/ California Environmental Quality Act documents related to this project.

Sincerely,

James R. Bybee
Environmental Coordinator
Northern Area

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

DJM

January 29, 1998

RECEIVED
FEB 5 - 1998
B. QUAN

Denis J. Mulligan
District Division Chief
Toll Bridge Program
California Department of Transportation
P.O. Box 23660
Oakland, CA 94623-0660

Dear Mr. Mulligan:

The Environmental Protection Agency has reviewed the information provided in your letter of December 23, concerning the proposed Purpose and Need Statement for the San Francisco-Oakland Bay Bridge (SFOBB) Retrofit project, Alameda County. Pursuant to the NEPA/404 Memorandum of Understanding (MOU), FHWA sent us a letter requesting concurrence on the purpose and need statement (statement dated October 30, 1997). We have been attending NEPA-404 meetings discussing the SFOBB Retrofit project since then to discuss the issues related to Purpose and Need.

We appreciate the documentation answering our questions and concerns. The Purpose and Need is far more extensive and detailed than what we had previously been given. Therefore, we are pleased to offer our concurrence on the Purpose and Need statement as it is presented. We believe that the NEPA-404 MOU process has worked well in this case; the documentation has greatly improved, clearly defining the issues and laying out the scope of the project. The overall project should benefit from these clarifications.

However, we want to clarify a point made in your December 23, letter. You state that you believe that the NEPA-404 MOU only requires EPA to concur on Purpose and Need and not on the draft statement of Purpose and Need. We are unclear about the distinction you are trying to make. We assume that if we grant concurrence on a Purpose and Need statement, at the Draft Environmental Impact Statement (DEIS) development stage, that "text" would be the same statement provided in the DEIS. Please review the Guidance papers of the NEPA-404 MOU, which state that at the project development stage, the need for a project must be ***very specific***. Information gathered during the earlier transportation planning and project planning stages should ensure that the project need is well defined at the project development stage. The Guidance papers go further to declare: "It is critical that the process which identified and quantified this specific need be explained clearly and concisely within the NEPA environmental document." If, as in this case, we don't review or concur on any documentation prior to what is presented in the project development stage, we must assume that all previous project and planning issues will be brought forward in a well developed Purpose and Need statement, as outlined in the MOU.

The NEPA-404 MOU asks that FHWA and Caltrans provide as much information, as clearly as possible, to the resource agencies so that we may understand the foundations for proposing a project. This enables us to offer suggestions and, if needed, guidance on alternatives, which in turn should improve the project and environmental documentation, moving it forward expeditiously. Therefore, we disagree with your interpretation of what our concurrence responsibilities are. Instead we would say that EPA's concurrence, at this stage, is on the **NEPA** Purpose and Need statement/404 basic and overall project purpose, not an outline of a purpose and need for a project. The documentation previously offered was more appropriate for addressing issues at the pre-scoping stage. The documents you provided on December 23, contained the appropriate level of detail for our concurrence at the Draft EIS development stage.

Thank you again for providing the information. Should you have any questions, or would like to discuss these issues further, please contact me at (415) 744-1577.

Sincerely,

David J. Carlson
Life Scientist, Federal Activities Office

cc: M. Littlefield (U.S. F&WS)
V. Alvarez (U.S. ACE)
D. Turci (FTA)
D.Harris (FHWA)
B.Wong(FHWA)

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
KLAND, CA 94623-0660
(0) 286-4444
TDD (510) 286-4454

February 4, 1998

Mr. William T. Hogarth, Ph.D.
Acting Regional Administrator
National Marine Fisheries Services
Southwest Region
501 West Ocean Blvd., Suite 4200
Long Beach, CA 90802-4213

Ala/SF 80
02100K

Dear Dr. Hogarth:

By this letter, we request concurrence that our proposed drilling work in San Francisco Bay will have no adverse effect to the endangered winter run Chinook salmon, the threatened west coast steelhead trout and the proposed threatened central valley steelhead trout. The drilling is necessary to assess bedrock and soil conditions for the East Span Seismic Safety Project. The drilling will consist of 12 borings in the Bay, and will be located north of the existing bridge. The drill equipment will be transported on two barges. The drill hole will be advanced inside a 24" diameter drill casing; the drill tools are inside the casing. All drilling fluids will be recirculated and collected on the barge. The drill fluids and cuttings will be tested and disposed of appropriately at designated disposal sites. No significant increase in turbidity due to barge drilling operations is anticipated.

This request is being made under the informal consultation provision of section 7 of the Endangered Species Act of 1973, as amended. The Federal Highway Administration has delegated Caltrans as their non-federal representative for section 7 consultations. We appreciate your assistance in this matter.

If you have any questions or need additional information, please call Sid Shadle, 510-286-6220.

Sincerely,

HARRY Y. YAHATA
District Director

By Marian Melandry
for DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

cc: Chris Mobley (National Marine Fisheries
John Schultz (FHWA)

bc: MMelandry/MMortenson, SHulsebus/PC
Sid Shadle Mike Davis (Parsons)

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

REPLY TO
ATTENTION OF:

FEB 1 ? 1998

Regulatory Branch

RECEIVED
FEB 17 1998
B. QUAN

SUBJECT: File Number 23013S

Mr. Dennis Mulligan
California Department of Transportation
111 Grand Avenue
Oakland, California 94623--0660

Dear Mr. Mulligan:

Thank you for your letter dated January 26, 1998, requesting final concurrence on the purpose and need statement and supporting documentation for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project pursuant to the NEPA/404 Integration Process Memorandum of Understanding (MOU). The Corps issued preliminary concurrence on the draft purpose and need statement for this project on November 5, 1997, based on your draft submittal sent on October 30, 1997. The final documentation contained in your January 26, 1998 submittal includes sufficient documentation on the project purpose and need to satisfy this step in the NEPA/404 Integration Process.

This letter serves as the Corps' final concurrence with the purpose and need statement, as provided in your January 26, 1998, submittal (attached). We look forward to continuing the NEPA/404 Integration Process for this project. It is our understanding that our next discussion and concurrence point is the review of criteria for alternative selection and project alternatives to be evaluated in the draft Environmental Impact Statement.

If you have any questions, please contact Victoria Alvarez, of my staff at 415-977-8472. If you wish to write, please address all correspondence to the District Engineer, Attention: Regulatory Branch, and refer to the file number at the head of this letter.

Sincerely,

Calvin C. Fong
Chief, Regulatory Branch

Enclosure

STATE OF CALIFORNIA—BUSINESS, TRANSPORTA AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

February 17, 1998

Dear NEPA/404 Participant:

Thank you for your continuing participation in the NEPA/404 Integration MOU process for the San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project. Written concurrence in the project Purpose & Need has been received from all NEPA/404 Integration MOU participants and other participating agencies.

We now request your agency's written concurrence in 1) the criteria for alternatives selection and 2) the range of alternatives to be included in the SFOBB East Span Seismic Safety Project Draft Environmental Impact Statement. A general overview of the conceptual range of alternatives and design variations was presented at the October 23, 1997 NEPA/404 Integration meeting at Caltrans offices (see attached presentation materials). At the November 17, 1997 meeting, the selection criteria Caltrans and the FHWA propose to use to establish the range of alternatives were presented. The NEPA/404 participants made some excellent suggestions, which we have added.

The criteria and range of alternatives presented for your concurrence are summarized in the following paragraphs.

Selection Criteria for Range of Alternatives

- Meets Caltrans criteria for designation as a lifeline route
- Meets current standards for operations and safety to the greatest extent possible
- Maintains the existing number of traffic lanes during peak hours and after construction
- Does not preclude a pedestrian/bicycle path
- Does not preclude future improvements to Yerba Buena Island (YBI) access ramps
- Minimizes impacts to environmental resources
- Provides a high level of visual quality
- Is a cost effective solution

Conceptual Range of Alternatives

The attached "San Francisco-Oakland Bay Bridge East Span Seismic Safety Project Alternatives Description Matrix" provides a summary of the alternatives.

Alternatives:

- No-Build
- Retrofit Existing Bridge
- N-1 (northernmost replacement alignment)
- N-2 (replacement alignment nearest to the north of the existing SFOBB East Span)
- S-1 (replacement alignment nearest to the south of the existing SFOBB East Span)
- S-2 (southernmost replacement alignment)

Design Variations:

- Single tower cable-stayed bridge
- Single tower self-anchored suspension bridge
- Skyway entire length

Profile Variations:

- Level approach grade
- Constant grade
- Elevated grade

Pedestrian/Bicycle Path Variations:

- With
- Without

Alternatives Considered and Withdrawn from Further Consideration

Caltrans has conducted a preliminary screening of alternatives based on the proposed criteria for defining the range of alternatives. Results of this screening were presented to NEPA/404 Integration MOU participants at the October and November 1997 meetings. Alternatives recommended for withdrawal from consideration include:

- Double deck structure - inability to provide open views toward the East Bay to eastbound travelers and increased cost of structural supports (visual quality and cost effectiveness)
- Northern Extended Alignment - potential siting of bridge piers on unstable geologic foundations (cost effectiveness of complex piers and footings)
- Southern Alignments - southern alignments that would completely displace the East Bay Municipal Utility District sewer outfall or could not be built due to construction staging impacts adjacent to the YBI tunnel east portal (cost effectiveness and environmental effects of dredging for replacement outfall)
- Northern Alignment - providing a straight alignment westbound from the SFOBB Toll Plaza due to impacts to Radio Point Beach (potential environmental impacts)

Based on the information summarized here, meeting presentations and discussions and the minutes documenting the two meetings, we anticipate you will be able to provide your written concurrence in the criteria for defining alternatives and the range of alternatives to be considered. Your letter of concurrence is requested within 45 days or less from receipt of this letter. A signature block has been provided below should you wish to document your concurrence by signing and returning this letter to Mara Melandry, Environmental Manager for the SFOBB East Span Seismic Safety Project.

If you have questions or comments or need additional information to expedite written concurrence, please contact Mara Melandry at 510/286-5582.

Sincerely,

HARRY Y. YAHATA
District Director

by

for DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

I concur with the SFOBB East Span Seismic Safety Project alternatives selection criteria and range of alternatives proposed for study by Caltrans.

_____ _____

Signed Date

_____

Representing

Enclosure

Distribution list (NEPA/404 signatories)
Dave Carlson (USEPA)
Mark Littlefield (USFWS)
Calvin Fong/Victoria Alvarez (USACOE)
Robert Horn/Donna Turci (FTA)
Dan Harris (Region IX (FHWA)
John Schultz (Calif. Division, FHWA)
James R. Bybee/ Chris Mobley (NMFS)

c: Congressman George Miller
Becky Ota (CF&G)
Steve Heminger (MTC)
Greg Walker/Andrea Gaut (RWQCB)
Christine Ferraz (BCDC)
Jerry Olmes (USCG)

bc: TAnziano, SHulsebus, MMelandry/MMortenson, CAdams, MDavis (PB)

04-SF-80-7.6/8.9
04-ALA-80-0.0/1.3
01200K
East Span Seismic Safety Project

Post-it™ brand transmittal memo 7671 | # of pages ▸ 1

To [redacted]	From Marilee Martinson
Co [redacted]	Co.
Dept.	Phone # 510-286-6212
Fax #	Fax #

United States Departm

FISH AND WILDLIF
Sacramento Fish and W
3310 El Camino Avenu
Sacramento, California 95821-6340

IN REPLY REFER TO:
PPN 2419

March 17, 1998

Denis J. Mulligan
District Division Chief
State of California Department of Transportation
Box 23660
Oakland, California 94623-0660

Subject: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, NEPA/404 Integration, San Francisco Bay, City of Oakland, San Francisco and Alameda Counties, California

Dear Mr. Mulligan:

This letter is in response to a February 17, 1998, California Department of Transportation (Caltrans) request for the U.S. Fish and Wildlife Service's (Service) concurrence with the criteria for alternative selection and the range of alternatives to be included in the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project (SFOBB). Our response is made pursuant to the 1994 Memorandum of Understanding on Integration of the National Environmental Policy Act and Clean Water Act Section 404 Procedures for Surface Transportation Projects and is not intended to take the place of any formal comments that may be required under the Fish and Wildlife Coordination Act or the Endangered Species Act of 1973, as amended.

The Service has reviewed the information provided by Caltrans concerning this project and concurs with the criteria for alternative selection and the range of alternatives to be included in the SFOBB Draft Environmental Impact Statement.

If you have any questions concerning the Service's comments on this project, please contact Mark Littlefield (Wetlands Branch) at (916) 979-2113.

Sincerely,

for Wayne S. White
Field Supervisor

cc: ARD-KCE, FWS, Portland, OR
EPA, San Francisco, CA (Attn: M. Monroe)
Corps of Engineers, San Francisco, CA
CDFG, Yountville, CA (Attn: F. Botti)

If you have questions or comments or need additional information to expedite written concurrence, please contact Mara Melandry at 510/286-5582.

Sincerely,

HARRY Y. YAHATA
District Director

by

Mara Melandry
for DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

I concur with the SFOBB East Span Seismic Safety Project alternatives selection criteria and range of alternatives proposed for study by Caltrans.

James Burfee
Signed

30 MARCH 1998
Date

Natl Marine Fisheries Serv.
Representing

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat Conservation Division
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404

APR 0 3 1998

April 2, 1998 F/SWO:DWC

Mr. Harry Yahata
Cal Dept. Of Transportation
Box 23660
Oakland CA 94623-0660

EXECUTIVE OFFICE
98 APR -3 PM 2:44

Dear Mr. Yahata:

Enclosed is our agency's concurrence to the 1) criteria for alternatives selection and 2) range of alternatives to be included in the SFOBB East Span Seismic Safety Project Draft Environmental Impact Statement.

Sincerely,

Dan Cheng, LT, NOAA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

April 6, 1998

Denis J. Mulligan
District Director
Caltrans District 4
P.O. Box 23660
Oakland, CA 94623-0660
Attn: Mara Melandry, Environmental Manager

Dear Mr. Mulligan:

The Environmental Protection Agency has reviewed the information provided in your letter dated February 17, concerning the proposed San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project. In your letter you requested our concurrence on both the criteria for alternatives selection and the range of alternatives to be considered within the Draft Environmental Impact Statement/Report. Pursuant to the NEPA/404 Memorandum of Understanding (MOU), we are pleased to offer our initial concurrence on 1) the criteria for alternatives selection and 2) the range of alternatives to be included within the SFOBB East Span Seismic Safety Project Draft Environmental Impact Statement/Report.

We appreciate your efforts in providing information in keeping with the NEPA/404 MOU. I look forward to reviewing the Draft Environmental Impact Statement/Report. Should you have any questions, please contact me at (415) 744-1522. If you have any questions regarding Section 404 issues, you may contact Rebecca Tuden in our Clean Water Act Compliance Office at (415) 744-1987.

Sincerely,

Mark H. Bartholomew

Mark H. Bartholomew
Life Scientist

cc: FHWA (Dan Harris)

sfobbmou.ltr #003062

cc: Mara

If you have questions or comments or need additional information to expedite written concurrence, please contact Mara Melandry at 510/286-5582.

RECEIVED
MAY 18 1998
B. QUAN

Sincerely,

HARRY Y. YAHATA
District Director

by

Mara Melandry

for DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

I concur with the SFOBB East Span Seismic Safety Project alternatives selection criteria and range of alternatives proposed for study by Caltrans.

Donna Turchie
Signed

5-15-98
Date

FTA
Representing

Enclosure

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
X 23660
KLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

May 22, 1998

Ms. Victoria Alvarez
Caltrans Liaison
Regulatory Branch
United States Army Corps of Engineers
333 Market Street
San Francisco, California 94105-2197

File: 04-SF-80-7.6/8.9
04-ALA-80-0.00/1.3
04228-01200K
SFOBB
East Span Seismic Safety Project

Dear Ms. Alvarez:

Subject: SFOBB East Span Seismic Safety Project – Illustration of Alignment Alternatives

Enclosed is an illustration of the various alignment alternatives for the East Span Seismic Safety Project, including alignments considered and withdrawn. This illustration is provided per your request, to assist you in preparing your concurrence on the criteria for alternative selection and the range of alternatives.

The illustration reflects changes in the alternatives since our initial request for concurrence on February 17, 1998. These include one new alignment alternative (N6) and several alignments which have been recently withdrawn from consideration (N1, N3 through N5, and S1). The new alignment alternative, N6, is similar to the alignment alternatives you have already evaluated. It is between N1 and N2, and it results in differences in the roadway geometry and the foundation geology. As a result, although a new alternative is being considered at this time, the overall range of alternatives has not changed: the range of alternatives continues to include the no-build alternative, retrofit of the existing structure, and replacement alternatives to the north and south of the existing bridge.

We look forward to receiving your concurrence. Thank you for your assistance with this important seismic safety project. If you have any questions, please call Marilee Mortenson at (510) 286-6212.

Sincerely,

HARRY Y. YAHATA
District Director

by

Mara Melandry

MARA MELANDRY
SFOBB Environmental Manager
Toll Bridge Program

bc: SHulsebus/PChongchaikit,
MMelandry/MMortenson,
MDavis (Parsons), File

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

REPLY TO
ATTENTION OF:

JUN 04 1998

Regulatory Branch

RECEIVED
JUN 8 1998
B. QUAN

SUBJECT: File No. 23013S

DJM

Mr. Dennis Mulligan
California Department of Transportation
111 Grand Avenue
Oakland, California 94623-0660

Dear Mr. Mulligan:

Thank you for your letter dated February 17, 1998, requesting concurrence on the criteria for alternatives selection and range of alternatives to be included in the San Francisco-Oakland Bay Bridge (SFOBB) Seismic Safety Project Draft Environmental Statement (DEIS).

This letter serves as the Corps' concurrence with the criteria for alternative selection and the range of alternatives to be included in the SFOBB Seismic Safety Project Draft DEIS (Attached). We look forward to reviewing a copy of the DEIS when it becomes available.

If you have any questions, please contact Victoria Alvarez, of my staff at 415-977-8472. If you wish to write, please address all correspondence to the District Engineer, Attention: Regulatory Branch, and refer to the file number at the head of this letter.

Sincerely,

Calvin C. Fong
Chief, Regulatory Branch

Enclosures

JUN 18 1998

U.S. Department of Transportation
United States Coast Guard

Commander
Maintenance & Logistics
Command Pacific

Coast Guard Island, Bldg 54D
Alameda, CA 94501-5100
Staff Symbol: sr
Phone: (510) 437-5900
FAX: (510) 437-5753

11011
June 15, 1998

DJM

Mr. Denis Mulligan
Toll Bridge Program Manager
State of California
Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

RECEIVED
JUN 18 1998
B. QUAN

Dear Mr. Mulligan:

In a meeting we had with representatives of your office on June 3rd, 1998, regarding the new eastern span of the San Francisco - Oakland Bay Bridge we were informed that some alternatives for the location of the temporary ramps on Yerba Buena Island would impact the access to our adjacent Coast Guard facilities. I want you to be aware that any location of these temporary ramps, or other portions of your project, that would limit our safe access to these facilities is unacceptable to the Coast Guard. In any acceptable scenario, our Yerba Buena Island facilities require unrestricted, 24-hour, vehicular access from both San Francisco and Oakland. The Coast Guard's ability to perform its critical missions in the San Francisco Bay Area (search & rescue, vessel traffic control, communications, etc.) must remain unhindered.

If you have any questions regarding this matter please contact me at the address above or (510) 437-5900.

Sincerely,

Robert B. Van de Loo

ROBERT B. VAN DE LOO
Realty Specialist
Maintenance & Logistics Command Pacific
By direction of the Commander

Copy: CG GROUP San Francisco
CG VTS San Francisco
CG Aids to Navigation Team San Francisco
CG MLCPAC (se), (sp)
CG CEU Oakland

EXECUTIVE SECRETARIAT
98 JUN 19

U.S. Department of Transportation
United States Coast Guard

Commander (Pow-2)
Eleventh Coast Guard District

Coast Guard Island
Alameda, CA 94501-5100
Staff Symbol: (Pow-2)
Phone: (510) 437-3514
FAX: (510) 437-5836

16591
San Francisco Bay (8.9)
Ser: 432-98
July 8, 1998

John Schultz
Chief, District Operations
Federal Highway Administration
California Division
980 9th St. Suite 400
Sacramento, CA 95814-2724

Dear Mr. Schultz:

The Coast Guard met with your agency and CalTrans on March 25, 1997 to discuss your letter of March 11, 1998, (encl. 1) in which you agreed to CalTrans request that you assume the role of lead agency status for the San Francisco-Oakland Bay Bridge East Span Replacement Project Project.

Our letters of June 23, 1997, June 24, 1997 and July 15 1997 (encls. 2, 3 and 4) stated that we would be willing to serve as cooperating agency for the replacement. Our letters did not address the contingency, however, that we be listed as cooperating agency if the ultimate decision was to retrofit the bridge. After we commented to CalTrans on July 6, 1998 that we had not been listed as a cooperating agency on the Administrative Draft document for the Seismic Safety project (encl. 5), Ms. Melandry asked us to identify our role for not only the replacement but also the possible retrofit alternatives.

Accordingly, the Coast Guard would be pleased to serve as cooperating agency for East Span Seismic Safety Project in accordance with 40 CFR 1501.6. We must issue a formal bridge permit under Section 9 of the 1899 Rivers and Harbors Act, as amended, for either the replacement or retrofit alternatives being considered. The Coast Guard bridge permit is the federal approval of the location and clearances of a bridge. Our primary consideration is whether the bridge provides safe passage for existing and prospective vessels operating on the waterway. In addition to the permit, we will be involved in the coordination of work evolutions that utilize waterborne equipment or otherwise affect navigational clearances–to minimize impacts navigation.

Our office will also serve as the main point of contact for Coast Guard cooperating agency responsibilities. In that context, we forwarded concerns of our Maintenance and Logistics Command planning and environmental concerns, along with those of our Coast Guard Group San Francisco on Yerba Buena Island as part of our July 6, 1998 letter (encl. 5).

16591
July 8, 1998

If we may be of any assistance, please do not hesitate to contact Mr. Jerry Olmes or me at (510) 437-3514.

Sincerely,

W.R. TILL
Chief, Bridge Section
U. S. Coast Guard
By direction of the District Commander

Encl: (1) Federal Highway Administration letter dated March 11, 1997
(2) My letter dated June 23, 1997
(3) My letter dated June 24, 1997
(4) My letter dated July 15, 1997
(5) My letter dated July 6, 1998

Copy: CalTrans District 04, ATTN Ms. Mara Melandry w/encls

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
KLAND, CA 94623-0660
) 286-4444
TDD (510) 286-4454

August 7, 1998

Wayne Till, Chief
Bridge Section
Eleventh Coast Guard district
Building 50-6, Coast Guard Island
Alameda, Ca 94501-5100

File: 04-SF-80-7.6/8.9
04-ALA-80-0.00/1.3
04228-01200K
SFOBB
East Span Seismic Safety Project

Dear Mr. Till:

Subject: East Span Seismic Safety Project –Replacement Alternatives and ADEIS Review

We are writing you and members of the other NEPA/404 MOU signatory agencies to provide an update on the changes to the replacement alternatives for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. There have been changes to the proposed replacement alternatives as well as the replacement alternatives considered and withdrawn since the time that we received your concurrence on the range of alternatives.

We are also writing to inform you that we will soon send for your information and comment a copy of the Administrative Draft Environmental Impact Statement (ADEIS).

Alternatives:

There have been some changes to the replacement alternatives since most of the NEPA/404 signatories provided concurrence on the range of alternatives. There is one new northern alignment alternative (N6) and one new southern alignment alternative (S4). There are now also several replacement alignments, which have been withdrawn from consideration (N1, N3 through N5, and S1 through S3).

Although two new replacement alternatives have been developed and some previous replacement alternatives have been withdrawn since most of the NEPA/404 signatories provided concurrence on the range of alternatives, the overall range of alternatives has not changed: it continues to include the no-build alternative, retrofit of the existing structure, and replacement alternatives to the north and south of the existing bridge. None of the new replacement alternatives precludes addition of a bicycle-pedestrian path.

The new replacement alternatives, N6 and S4, are similar to the alignment alternatives you have already evaluated. Alternative N6 is between N1 and N2, and it results in improvements in the roadway geometry and the foundation geology. Alternative S4 is similar to S2, and it results in improvements in the roadway geometry as well as shorter temporary detour structures which reduce temporary fill in San Francisco Bay. An enclosure illustrates the alignments.

Administrative Draft Environmental Impact Statement (ADEIS)

We are now preparing the Administrative Draft Environmental Impact Statement (ADEIS). It is targeted for internal distribution beginning August 17, 1998, with public circulation of the Draft Environmental Impact Statement (DEIS) targeted for September. During internal distribution we will send you a copy for your information.

Thank you for your assistance with this important seismic safety project. If you have any questions, please call me at (510) 286-6682.

Sincerely,

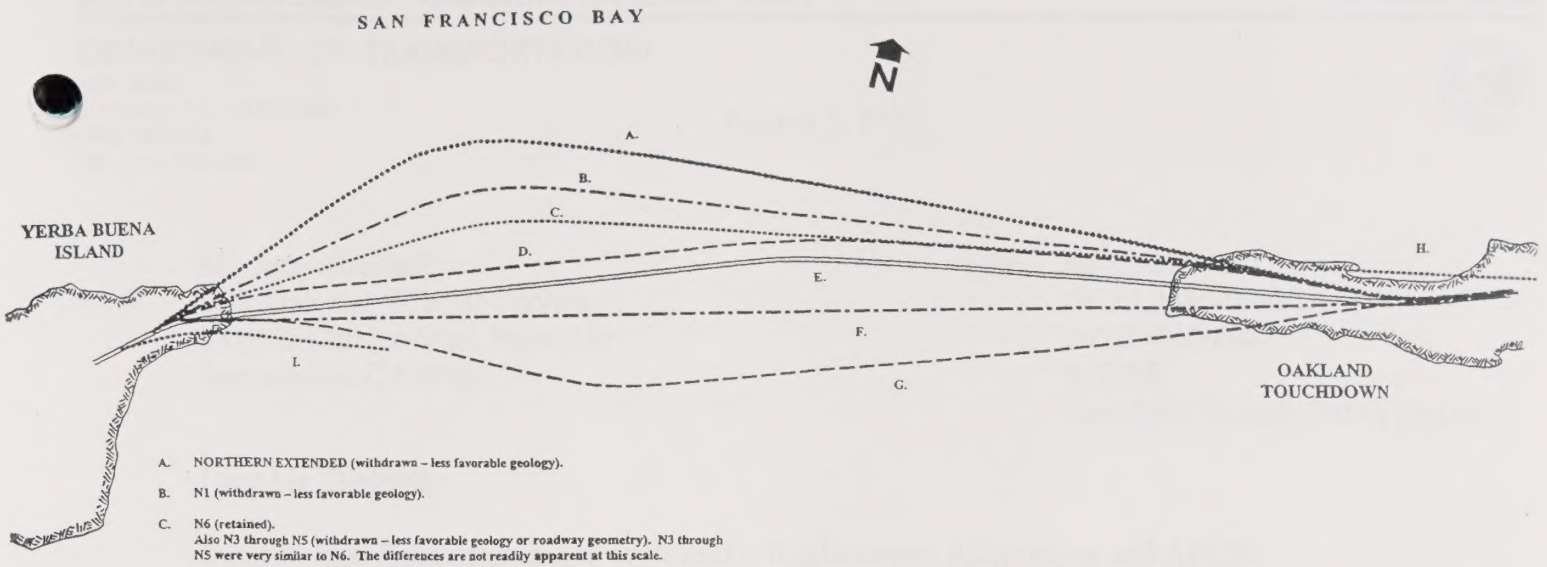
HARRY Y. YAHATA
District Director

by
Mara Melandry

MARA MELANDRY
SFOBB Environmental Manager
Toll Bridge Program

Enclosure

c: Victoria Alvarez (ACOE), Mark Bartholomew (EPA), Donna Turci (FTA), Chris Mobley (NMFS), Jeff Bielfeldt (USFWS), Bill Wong (FHWA), Dan Harris (FHWA)



A. NORTHERN EXTENDED (withdrawn – less favorable geology).

B. N1 (withdrawn – less favorable geology).

C. N6 (retained).
Also N3 through N5 (withdrawn – less favorable geology or roadway geometry). N3 through N5 were very similar to N6. The differences are not readily apparent at this scale.

D. N2 (retained).

E. EXISTING ALIGNMENT: NO-BUILD AND RETROFIT ALTERNATIVES (retained).

F. S1 (withdrawn – conflicts with East Bay Municipal Utility district's sewer outfall).

G. S2 (withdrawn – less favorable roadway geometry and more temporary fill).
S4 (very similar to S3, difference not apparent at this scale).

H. NORTHERN ALIGNMENT THROUGH RADIO POINT BEACH (withdrawn – impacts to Radio Point Beach). This is not a complete alignment per se. It is a detail variation of the northern alignments.

I SOUTHERN ALIGNMENTS ADJACENT TO TUNNEL EAST PORTAL (withdrawn – construction difficulties). These are not complete alignments per se. They are detail variations of the southern alignments.

BAY BRIDGE EAST SPAN PROJECT

Caltrans

SFOBB EAST SPAN SEISMIC SAFETY PROJECT
ALIGNMENT ALTERNATIVES, INCLUDING ALIGNMENTS CONSIDERED AND WITHDRAWN

NOT TO SCALE

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

August 7, 1998

Mr. Jerry Bielfedlt
U.S. Fish and Wildlife Service
3310 El Camino Way, Suite 130
Sacramento, CA 95821

File: 04-SF-80
04-ALA-80-0.00/1.3
04228-01200K
SFOBB
East Span Seismic Safety Project

Dear Mr. Bielfedlt:

Subject: East Span Seismic Safety Project – Replacement Alternatives and ADEIS

We are writing you and members of the other NEPA/404 MOU signatory agencies to provide an update of the changes to the replacement alternatives for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. There have been changes to the proposed replacement alternatives as well as the replacement alternatives considered and withdrawn since the time that we received your concurrence on the range of alternatives.

We are also writing to inform you that we will soon send for your information a copy of the Administrative Draft Environmental Impact Statement (ADEIS) to you and the other NEPA/404 signatories.

Alternatives:

There have been some changes to the replacement alternatives since most of the NEPA/404 signatories provided concurrence on the range of alternatives. There is one new northern alignment alternative (N6) and one new southern alignment alternative (S4). There are now also several replacement alignments, which have been withdrawn from consideration (N1, N3 through N5, and S1 through S3).

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Administrative Draft Environmental Impact Statement (ADEIS)

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Thank you for your assistance with this important seismic safety project. If you have any questions, please call me at (510) 286-6682.

Sincerely,

HARRY Y. YAHATA
District Director

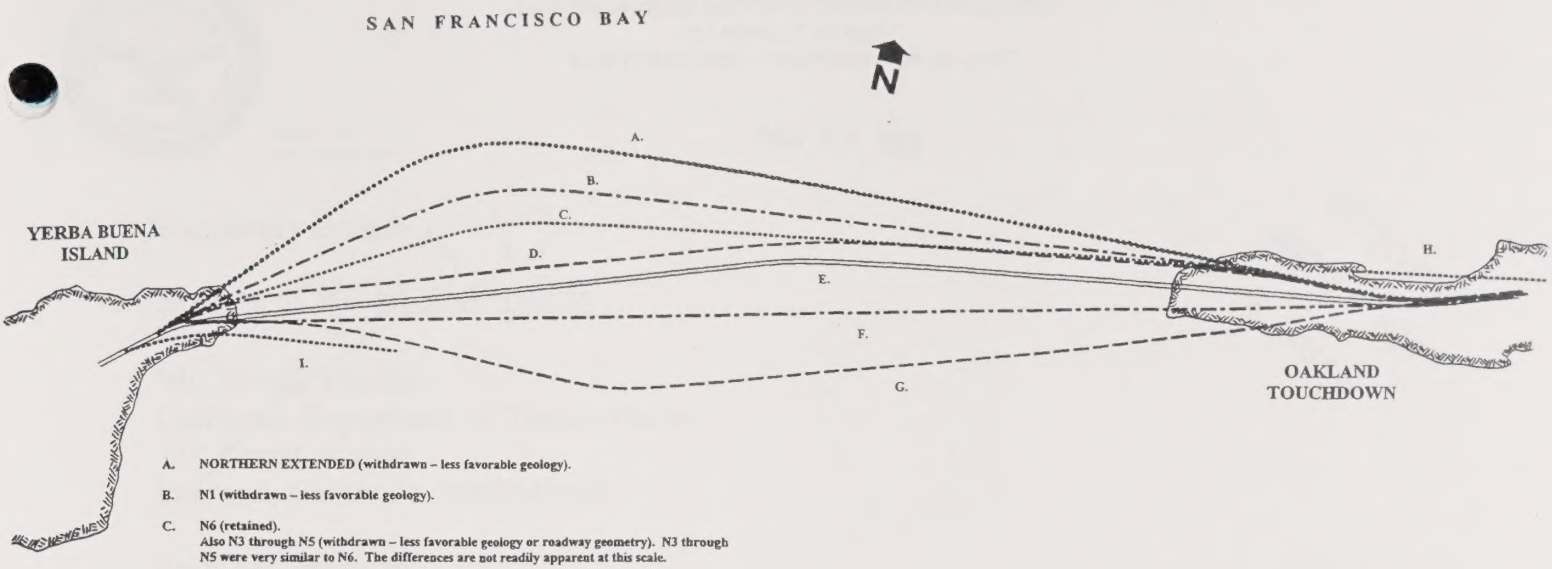
by

Mara Melandry

MARA MELANDRY
SFOBB Environmental Manager
Toll Bridge Program

Enclosure

c: Victoria Alvarez (ACOE), Mark Bartholomew (EPA), Donna Turci (FTA), Chris Mobley (NMFS), Jeff Bielfeldt (USFWS), Bill Wong (FHWA), Dan Harris (FHWA)



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C. N6 (retained).
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E. EXISTING ALIGNMENT: NO-BUILD AND RETROFIT ALTERNATIVES (retained).

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I SOUTHERN ALIGNMENTS ADJACENT TO TUNNEL EAST POETAL (withdrawn – construction difficulties). These are not complete alignments per se. They are detail variations of the southern alignments.

BAY BRIDGE EAST SPAN PROJECT

Caltrans

SFOBB EAST SPAN SEISMIC SAFETY PROJECT
ALIGNMENT ALTERNATIVES, INCLUDING ALIGNMENTS CONSIDERED AND WITHDRAWN

NOT TO SCALE

AUG 24 1998

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

REPLY TO
ATTENTION OF:

AUG 20 1998

Regulatory Branch

SUBJECT: File Number 23013S

RECEIVED
AUG 24 1998
B. QUAN

Mr. Dennis Mulligan
California Department of Transportation
111 Grand Avenue
Oakland, California 94623-0660

Dear Mr. Mulligan:

Thank you for your letter dated August 7, 1998, regarding the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project (east span replacement). Your letter indicates that there have been changes to the proposed replacement alternatives and several alternatives have been withdrawn from consideration since the Corps transmitted the concurrence letter regarding the range of alternatives pursuant to the Memorandum of Understanding on the National Environmental Policy Act and the Clean Water Act Section 404 Integration Process of 1993 (NEPA/404 Integration Process). Specifically, your letter indicates that two new replacement alternatives (N6 and S4) have been added and that these alternatives are similar to alternatives that the Corps has already evaluated. Your letter also indicates that previous replacement alternatives (N1, N3 through N5 and S1 through S3) have been withdrawn from consideration.

Since there have been changes to the replacement alternatives since the Corps provided concurrence pursuant to the NEPA/404 Integration Process, we would like the opportunity to review and evaluate the range of alternatives now under consideration. The alternative alignment descriptions and mapping provided in your August 7, 1998, letter do not sufficiently describe or depict the new alignment alternatives. A description of the new alternatives along with a graphic showing the location of the alternatives currently under consideration should be provided to our office at your earliest convenience.

Your submittal should describe the configuration of all alternatives currently under consideration. Where replacement alternatives are being considered (replacement alternatives N6 and S4), information on how the new alternatives differ from those previously under consideration should be provided. As noted above, the descriptions should be accompanied by a graphic showing the location of all alternatives currently under consideration. Following our review of your submittal, if there are no additional questions or issues to be discussed, the Corps will provide a revised concurrence letter for the range of alternatives now under consideration in accordance with the NEPA/404 Integration Process.

If you have any questions, please call Victoria Alvarez of our Regulatory Branch at telephone 415-977-8472. Please address all correspondence to the District Engineer, Attention: Regulatory Branch, and refer to the file number at the head of this letter.

Sincerely,

Edward A. Wyle

for Calvin C. Fong
Chief, Regulatory Branch

Copies Furnished:

U.S. EPA, San Francisco (Mark Bartholomew)
U.S. FWS, Sacramento (Mark Littlefield)
U.S. FHWA, San Francisco (Dan Harris)
U.S. FHWA, Sacramento (Bill Wong)
U.S. NMFS, Santa Rosa (Chris Mobely)
U.S. FTA San Francisco (Donna Turci)

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION

23660
AND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

August 27, 1998

Mr. Calvin C. Fong, Chief
Regulatory Branch
United States Army Corps of Engineers
333 Market Street
San Francisco, California 94105-2197

File: 04-SF-80-7.6/8.9
04-ALA-80-0.00/1.3
04228-012000
SFOBB
East Span Seismic Safety Project

Dear Mr. Fong:

Subject: SFOBB East Span Seismic Safety Project –Alignment Alternatives

We received your letter of August 20 requesting an opportunity to review and evaluate the range of alternatives now under consideration for the East Span Seismic Safety Project. To facilitate this, you requested a description of the new alternatives along with a graphic showing the location of the alternatives currently under consideration.

Below is the information that you requested. Additional information may also be found in the Administrative Draft Environmental Impact Statement (ADEIS) for the SFOBB East Span Seismic Safety Project, a copy of which was provided to Ms. Vicki Alvarez, Caltrans Liaison to the Regulatory Branch, on August 17, 1998.

The alignment refinement process has been ongoing since the initial NEPA/404 MOU consultations concerning range of alternatives to be considered. As more engineering information was developed, new alignment alternatives were studied and some alignment alternatives were withdrawn. The alternatives still include a no-build alternative, a retrofit alternative and replacement alternatives. All replacement alternatives under consideration are within the geographic range presented at the initial NEPA/404 meeting, to the north and south of the existing bridge. As agreed to by the NEPA/404 signatories in the concurrence on Purpose and Need, none of the new replacement alternatives precludes addition of a bicycle-pedestrian path. There is no new alternative that proposes a new corridor, a new mode choice, or an expansion of capacity. As with the initial replacement alternative alignments, all new alternatives would consist of two parallel bridge structures.

Along with the discussion below, please see the enclosed Figure 2-3 and Figure 2-10, taken from the ADEIS, which show the proposed replacement alternatives and the replacement alternatives that have been considered and withdrawn.

Proposed Replacement Alternatives

Alternative N-2 is one of the initial replacement alternatives; it is being carried forward. The new replacement alternatives under consideration, N-6 and S-4, are partial refinements of the specific alignment alternatives originally presented to NEPA/404 MOU participants. (See the enclosed Figure 2-3 taken from the ADEIS.)

- **Replacement Alternative N-2** would construct a 3,585-meter (11,759-foot) long new bridge north of the existing East Span and dismantle the existing structure. The N-2 alignment parallels the existing bridge and maintains minimal clearance between the old and new structures to accommodate constructing the new bridge and dismantling the existing structure.

- **Replacement Alternative N-6** would construct a 3,620-meter (11,877-foot) long new bridge north of the existing East Span and dismantle the existing structure. The N-6 alignment represents a continuation of design refinements to Alternative N-1 to maximize panoramic vistas of the San Francisco and East Bay hills, avoid unstable Bay bottom geologic conditions, and set an alignment placing a signature span tower as close to Yerba Buena Island (YBI) as possible.

  The Alternative N-6 alignment differs from other northern alignments only slightly, being located south of the N-1 alignment and north of the N-2 alignment. The modification to the alignment resulted from 1) positioning the alignment and signature span tower location to take advantage of relatively shallow depths to bedrock and 2) application of a 900-meter (3,000–foot) radius horizontal curve between the YBI viaduct and the tangent section in which a signature span would be located. Application of this reduced curve radius allows for an alignment that provides somewhat lessened but still dramatic scenic views and minimizes intrusion into areas of deep Bay muds to the north of the existing bridge. This alignment modification was informed by results of detailed in-Bay geotechnical studies that provided more detailed mapping of Bay bottom conditions than when Alternative N-1 was defined.

  As with all northern alignment considered, the skyway portion of the alignments would be similar and would reach the Oakland Touchdown area at approximately the same location.

- **Replacement Alternative S-4** would construct a 3,550-meter (11,644-foot) bridge south of the existing East Span and dismantle the existing structure. The S-4 alignment was developed to minimize bridge length and to avoid use of flat land to the north of the existing East Span on YBI while attempting to avoid conflicts with the alignment of the EBMUD sewer outfall south of the existing East Span. The S-4 alignment uses the same horizontal curve radius between the YBI East Viaduct and the signature span applied to the N-6 alignment. As a result, Alternative S-4 would allow for the placement of a signature span tower closer to YBI than possible with Alternative S-2 and eliminate the need to construct long temporary detour structures over Bay waters.

  The skyway portion of the S-4 alignment is the same as the skyway portion of the S-2 alignment and reaches the Oakland Touchdown area at the same location.

Replacement Alternatives Considered and Withdrawn

Alternatives N-1, N-3 through N-5 and S-1 through S-3 referenced in your letter dated August 20, 1998 are alignment alternatives developed in response to new, detailed geologic data. These alignment alternatives also were defined to test engineering designs attempting to respond to seismic safety and traffic operational issues referenced in the project Purpose and Need statement. (See the enclosed Figure 2-10 taken from the ADEIS).

The rationale for withdrawal of alignment alternatives is presented in the summary below:

- Alternative N-1 – Based on results of geologic studies, it was determined that approximately one-half of the N-1 alignment would fall within areas of deep young Bay mud, which would potentially decrease seismic performance of the structure and increase construction cost. Given considerations of construction complexity, schedule, construction cost and reduced seismic performance, it was recommended for withdrawal.
- Alternative N-3 – This alignment study looked at placing the signature span tower near the YBI shore to take advantage of shallow depths to bedrock. However, the requirement for a tangent, or straight, section for a signature span would have forced curves between the YBI East Viaduct and the signature span that would not meet American Association of State Highway and Transportation Officials (AASHTO) standards. A mandatory design exception from FHWA would have been required. This alignment was dropped from consideration.
- Alternative N-4, a refinement of Alternative N-3, presented a trade-off between signature span location and roadway geometric design. The alignment would not require design exceptions, but the tower location would have been forced into deep water locations within the navigation channel, where tower construction would be more complex. Based on increased complexity of tower construction, Alternative N-4 was withdrawn from further consideration.
- Alternative N-5 was an additional alignment refinement seeking to define an acceptable trade-off between roadway geometrics and signature span tower location. The N-5 alignment provided a large radius curve that would avoid sight distance issues but would not allow for a tangent roadway section approaching the YBI tunnel. Tower location would remain in deep water. Based on less than optimal location of the tower and the roadway geometrics, Alignment N-5 was withdrawn from further consideration in favor of Alternative N-6.
- Alternative S-1 was originally defined as the most direct replacement alignment between YBI and the Oakland Touchdown area. However, the alignment would require an in-Bay crossing of the East Bay Municipal Utility District (EBMUD) sewer outfall. EBMUD determined that an underwater transverse crossing of the outfall was not feasible. This alignment would require relocation of the sewer outfall. Cost to relocate the outfall was estimated to be in excess of $100 million and would require its own environmental review separate from the East Span Project. Based on these considerations, Alternative S-1 was withdrawn from further consideration.

- Alternative S-2 was originally defined as an alignment that would avoid the EMBUD sewer outfall and provide a roadway alignment that would not require FHWA design exceptions. However, geometric constraints of the tunnel and YBI East Viaduct approach forced the signature span tower location into deep water. Temporary detour structures required at YBI to transition traffic from the existing span to the replacement bridge would need to extend into the Bay. Further engineering evaluation of these detour structures raised concerns for the structural integrity of the existing East Span cantilever section. Therefore, Alternative S-2 was withdrawn from further consideration.
- Alternative S-3 represents a continuation of south alignment design refinements. It is a refinement of Alternative S-1 at Yerba Buena Island. Like S-1, it has an in-Bay crossing of the EBMUD sewer outfall. The S-3 alignment studied modifications of roadway geometrics approaching the YBI tunnel. However, the resulting design would have required a deep water tower location and the use of temporary detour structures connecting to the existing cantilever section. Based on concerns for the structural integrity of the existing bridge and the need for a transverse crossing of the EBMUD outfall, Alternative S-3 was withdrawn from consideration in favor of Alternative S-4.

This summarizes the proposed replacement alternatives and the alternatives considered and withdrawn. We appreciate any efforts your agency can make to review this information and provide a revised concurrence letter at your earliest convenience. Caltrans' target date for circulation of the Draft Environmental Impact Statement is September 17, 1998.

If you need additional information or have any questions, please call Marilee Mortenson at (510) 286-6212 immediately, and she will provide what you need to complete your review and evaluation.

Sincerely,

HARRY Y. YAHATA
District Director

by

Mara Melanary

for DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:
PPN 2419

September 1, 1998

Mara Melandry - Environmental Manager
Caltrans District 4
111 Grand Avenue,
Oakland, California 94623-0660

Subject: Administrative Draft Environmental Impact Report/Statutory Exemption for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project

Dear Ms. Melandry:

The U.S. Fish and Wildlife Service (Service) has reviewed the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project (SFOBB) Administrative Draft Environmental Impact Report/Statutory Exemption (ADEIS), dated August 17, 1998, regarding a proposal to upgrade the existing East Span of the San Francisco-Oakland Bay Bridge. Our comments are provided pursuant to the 1994 Memorandum of Understanding on Integration of the National Environmental Policy Act and Clean Water Act Section 404 Procedures for Surface Transportation Projects and are intended to assist you in your review of the proposed project. These comments will not take the place of any formal comments that may be required at a later date pursuant to the Fish and Wildlife Coordination Act (FWCA) or the Endangered Species Act of 1973, as amended (Act).

GENERAL COMMENTS

The ADEIS evaluates Caltrans proposal to upgrade the existing East Span of the San Francisco-Oakland Bay Bridge. Under provisions of the FWCA, the Service advises the U.S. Army Corps of Engineers (Corps) on projects involving dredging and fill activities in "waters of the United States," and special aquatic sites, which include wetlands such as those found on the proposed project site. Since the proposed project will require a Corps permit, pursuant to Section 404 of the Clean Water Act, the Service will provide comments to the Corps under FWCA authority. When reviewing public notices, the objectives of the Service are: "Ensuring that all authorized works, structures, and activities are (1) judged to be the least ecologically damaging alternative or combination of alternatives (e.g., all appropriate means have been adopted to minimize environmental losses and degradations) and (2) in the public's interest in safeguarding the environment from loss and degradation." (Federal Register, Vol. 40, No. 231, December 1, 1975).

When projects impacting waterways or wetlands are deemed acceptable to the Service, we recommend full mitigation for any impacts to fish and wildlife. The Council on Environmental Quality regulations for implementing the National Environmental Policy Act define mitigation to

include: 1) avoiding the impact; 2) minimizing the impact; 3) rectifying the impact; 4) reducing or eliminating the impact over time; and 5) compensating for impacts. The Service supports and adopts this definition of mitigation and considers the specific elements to represent the desirable sequence of steps in the mitigation planning process.

Because of their high value to migratory birds, and their ever-increasing scarcity in California, our mitigation goal for wetlands (including mudflats and eelgrass beds) is no net loss of in-kind habitat value or acreage (whichever is greater)

The proposed alternatives will have relatively minor impacts to wetland resources. Impacts range from no loss of acreage associated with the No-Action and Retrofit alternatives; to losses of 0.07 acre of wetlands, 0.15 acre of mudflats, and 0.075 acre of eelgrass beds associated with the southern alternative (Alternative S-4). While the quantities are small, the Service's mitigation goal for wetlands, as stated above, is no net loss of in-kind habitat value or acreage.

The Service advises Caltrans to examine compensatory mitigation sites in the vicinity of impact sites. Mitigation areas constructed adjacent to impact sites will benefit local wildlife and/or fisheries resources. We encourage Caltrans to examine the potential of providing compensatory mitigation in the areas of the Oakland touch down (Oakland side of the SFOBB proposal), or the Port of Oakland because of their potential to augment the high value wildlife habitat of the Emeryville Crescent. The Oakland touch down and Port of Oakland areas also have the potential for continued success without extensive management.

To adequately compensate for any loss of habitat function or value due to temporal losses, we recommend a mitigation ratio of 3:1 for losses associated with wetlands and special aquatic sites. This recommendation is based on habitat evaluations conducted for similar projects within the Bay Area.

We appreciate Caltrans' coordination efforts and the opportunity to provide input during this stage of planning. If you have any questions regarding our comments, or require further information, please contact Jerry Bielfeldt in the Wetlands Branch at (916) 979-2113.

Sincerely,

Dale A. Pierce

for Wayne S. White
Field Supervisor
U.S. Department of the
Interior Coordinator

cc: AES, Portland, OR

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

REPLY TO ATTENTION OF:

SEP 03 1998

RECEIVED
SEP 4 - 1998
B. QUAN

Regulatory Branch

SUBJECT: File Number 23013S

DSM

Mr. Dennis Mulligan
California Department of Transportation
111 Grand Avenue
Oakland, California 94623-0660

Dear Mr. Mulligan:

Thank you for your letter dated August 27, 1998, providing updated information on the range of alternatives currently under consideration for the San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project pursuant to the NEPA/404 Integration Process Memorandum of Understanding (MOU). The Corps provided concurrence on the range of alternatives by letter dated June 8, 1998. In an August 7, 1998 letter, you informed the Corps that two new replacement alternatives (N6 and S4) were added and that several alternatives (N1, N3 through N5 and S1 through S3) were withdrawn from consideration. By letter dated August 20, 1998, the Corps requested that Caltrans provide information describing all alternatives currently under consideration as well as a graphic showing the location of these alternatives. The requested information was provided as an attachment to your August 27, 1998 letter.

The Corps has reviewed the information provided in your August 27, 1998 letter. The information adequately describes and depicts the project alternatives currently under consideration. Therefore, this letter serves as the Corps' concurrence on the revised range of alternatives pursuant to the NEPA/404 Integration Process MOU (Attachment 1). It is the Corps' understanding that the alternatives described will be further described in the project Draft Environmental Impact Statement (DEIS).

We look forward to continuing the NEPA/404 Integration Process for this project. It is the Corps' understanding that our next decision/discussion points will include verification of the jurisdictional determination and identification of the final EIS NEPA preferred/section 404 least environmentally damaging practicable alternative.

If you have any questions, please contact Victoria Alvarez, of our Regulatory Branch at 415-977-8472. If you wish to write, please address all correspondence to the District Engineer, Attention: Regulatory Branch, and refer to the file number at the head of this letter.

Sincerely,

Calvin C. Fong
Chief, Regulatory Branch

Enclosures

Copies Furnished:

U.S. EPA, San Francisco CA (Mark Bartholomew)
U.S. FWS, Sacramento, CA (Mark Littlefield)
U.S. FHWA, San Francisco, CA (Dan Harris)
U.S. NMFS, Santa Rosa, CA (Chris Mobely)
U.S. CG, Oakland, CA (Jerry Olmes)
U.S. FTA, San Francisco, CA (Donna Turci)

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

REPLY TO
ATTENTION OF:

Regulatory Branch

SUBJECT: File Number 23013S

Mr. Dennis Mulligan
California Department of Transportation
111 Grand Avenue
Oakland, California 94623-0660

Dear Mr. Mulligan:

Thank you for your submittal of August 17, 1998, requesting confirmation of the extent of Corps of Engineers jurisdiction at within the project boundary of the San Francisco-Oakland East Span Seismic Safety Project located in San Francisco and Alameda Counties, California. Victoria Alvarez, of my staff, met with Jennifer O'Connell of Woodward-Clyde Consultants and Beverly McIntosh of the California Department of Transportation (Caltrans) on August 27, 1998, to review the delineation. A second field inspection was performed on September 3, 1998 to review previously undelineated wetland areas on the eastern end of the project.

Enclosed is a map showing the extent and location of Corps of Engineers jurisdiction within the project boundary. We have based this jurisdictional delineation on the current conditions of the site. A change in those conditions may also change the extent of our jurisdiction. This jurisdictional delineation will expire in five years from the date of this letter. However, if there has been a change in circumstances which effects the extent of Corps jurisdiction, a revision may be done before that date.

All proposed work and/or structures extending bayward or seaward of the line on shore reached by: (1) mean high water (MHW) in tidal waters, or (2) ordinary high water in non-tidal waters designated as navigable waters of the United States, must be authorized by the Corps of Engineers pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Additionally, all work and structures proposed in unfilled portions of the interior of diked areas below former MHW must be authorized under Section 10 of the same statute.

All proposed discharges of dredged or fill material into waters of the United States must be authorized by the Corps of Engineers pursuant to Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344). Waters of the United States generally include tidal waters, lakes, ponds, rivers, streams (including intermittent streams), and wetlands.

Your proposed work appears to be within our jurisdiction and a permit is required. Application for Corps authorization should be made to this office using the application form in the enclosed pamphlet. To avoid delays it is essential that you enter the file number at the top of this letter into Item No. 1. The application must include plans showing the location, extent and character of the proposed activity, prepared in accordance with the requirements contained in this pamphlet. You should note, in planning your work, that upon receipt of a properly completed application and plans, it may be necessary to advertise the proposed work by issuing a public notice for a period of 30 days.

Since an individual permit is required, it will be necessary for you to demonstrate to the Corps that your proposed fill is necessary because there are no practicable alternatives, as outlined in the U.S. Environmental Protection Agency's Section 404(b)(1) Guidelines. A copy is enclosed to aid you in preparation of this alternative analysis.

If you have any questions, please call Victoria Alvarez of our Regulatory Branch at telephone 415-977-8472. Please address correspondence to the District Engineer, Attention: Regulatory Branch, and refer to the file number at the head of this letter.

Sincerely,

Calvin C. Fong
Chief, Regulatory Branch

Enclosure

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

IN REPLY REFER TO:
PPN 2419

January 22, 2001

Ms. Mara Melandry
Environmental Manager, SFOBB
California Department of Transportation
Post Office Box 23660
Oakland, California 94623-0660

Dear Ms. Melandry:

The U.S. Fish and Wildlife Service has reviewed the November 2000 *Conceptual Mitigation Plan for Special Aquatic Sites* and concurs with the determination that the plan adequately addresses impacts associated with the replacement of the East Span of the San Francisco - Oakland Bay Bridge. While the plan is adequate, we request that you continue to identify additional means of avoiding and minimizing project associated impacts.

This concurrence is provided pursuant to the 1994 Memorandum of Understanding on Integration of the National Environmental Policy Act and Clean Water Act Section 404 Procedures for Surface Transportation Projects. These comments will not take the place of any formal comments that may be required at a later date pursuant to the Fish and Wildlife Coordination Act or the Endangered Species Act of 1973, as amended.

If you have any questions, please contact Jerry Bielfeldt (Wetlands Branch) at (916) 414-6584.

Sincerely,

Dale A. Pierce
Acting Field Supervisor

cc: ARD (ES)-Portland, OR
EPA, San Francisco, CA (Attn: Liz Varnhagen)
NMFS, Sacramento, CA (Attn: Kelly Finn)
FHWA, Sacramento, CA
ACOE, San Francisco, CA

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

REPLY TO
ATTENTION OF:

FEB 12 2001

Regulatory Branch

SUBJECT: File Number 23013S: San Francisco-Oalkand Bay Bridge Seismic Safety Project

Ms. Mara Melandry
California Department of Transportation
111 Grand Avenue
Oakland, California 94623-0660

Dear Ms. Melandry:

This letter is in response to your submittals of January 22 and January 27, 2001 regarding the San Francisco-Oakland Bay Bridge Seismic Safety Project. The January 22, 2001 submittal requests the Corps' agreement with the conceptual mitigation plan that is included in that submittal. The submittal of January 27, 2001 is for the Corps' agreement that the N-6 alternative, for a new east span of the Bay Bridge, is the least environmentally damaging practicable alternative (LEDPA) based on the 404(b)(1) alternatives analysis that is included with the submittal.

After reviewing the above information, the Corps agrees with the conceptual mitigation and agrees that the N-6 alternative is the LEDPA. Please be advised that the Corps will not issue a public notice for the proposed project until a detailed mitigation plan is submitted to and approved by the Corps. A discussion of the mitigation will be included in the public notice.

Should you have any questions please call Mr. Rob Lawrence of our Regulatory Branch at (415) 977-8447. If you wish to write, please address all correspondence to Mr. Rob Lawrence, Regulatory Branch and refer to the file number at the head of this letter.

Sincerely,

Calvin C. Fong
Chief, Regulatory Branch

Copy Furnished:

US F&WS, Sacramento, CA Attn: Jerry Bielfeldt
US EPA, San Francisco, CA Attn: Mike Monroe
US NMFS, Santa Rosa, CA Attn: Brian Mulvey
BCDC, San Francisco, CA Attn: Bob Batha
CA F&G, Menlo Park, CA Attn: Becky Ota
CA F&G, Yountville, CA Attn: Scott Wilson
CA RWQCB, Oakland, CA Attn: Keith Lichten
CA SLC, Sacramento, CA Attn: Mary Howe

cc: Denis Mulligan
Steve Hulsebus
Brian Maroney
Cindy Adams (HQ)
Bill Wong (FHWA)
Ivy Edmonds-Hess (Parson Brinkerhoff)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

EXECUTIVE OFFICE
01 MAR 23 AM 10: 12

MAR 15 2001

Mr. Harry Y. Yahata
District Director
Caltrans – District 4
111 Grand Avenue
P.O. Box 23660
Oakland, CA 94623

Dear Mr. Yahata:

This letter responds to your letter of January 17, 2001, in which you requested our concurrence, under the NEPA/Clean Water Act Section 404 Integration Process MOU (NEPA/404 MOU), on the least environmentally damaging practicable alternative (LEDPA) for the **San Francisco Bay Bridge East Span Seismic Safety Project**. It also responds to your letter of January 22, 2001, which requested our views regarding the adequacy of the conceptual mitigation plan for the subject project.

In response to your request regarding the LEDPA, we have reviewed your January 2001 document entitled "Alternatives Analysis and Compliance with Section 404(b)(1) Guidelines." That document describes and analyzes a broad range of alternatives and concludes that Replacement Alternative N-6 is the least environmentally damaging practicable alternative . Based on our review of your analysis, and conversations with your staff and representatives of the Army Corps of Engineers and the U. S. Fish and Wildlife Service, we concur that Replacement Alternative N-6 is the LEDPA. We believe Alternative N-6 would enable Caltrans to meet the project's basic purpose while reducing adverse project impacts to aquatic resources to an acceptable level.

We have reviewed your conceptual mitigation plan of November 2000. We also have discussed this conceptual plan with your staff on several occasions. Based on this review and these discussions, we believe the conceptual mitigation plan identifies appropriate measures, both on-site and off-site, to reduce and offset unavoidable project impacts to non-tidal wetlands, inter-tidal sand flats, and eelgrass. We are particularly interested in the off-site mitigation feature that Caltrans proposes to undertake at the Bruener property. According to your January 22, 2001 letter, this mitigation will consist of creating 64.35 acres of tidal marsh ecosystem. We believe this proposal is sound and should be pursued, although many details will need to be resolved during the development of the final mitigation plan. If, for any reason, it is not possible to implement the off-site mitigation plan at the Bruener property, Caltrans should undertake mitigation of a similar nature and size at the Liquid Gold site or at some other suitable

site. We are available to work with your staff to ensure that the final mitigation plan satisfies these commitments and addresses all pertinent issues.

If you have questions regarding these comments, please contact Michael Monroe of our Wetlands Regulatory Office at (415) 744-1963, or Nova Blazej of my staff at (415) 744-2089.

Sincerely,

Lisa B. Hanf

Lisa B. Hanf, Manager
Federal Activities Office

cc: B. Batha, BCDC, San Francisco
C. Fong, USACE, San Francisco
M. Littlefield, USFWS, Sacramento
J. West, SFBRWQCB, Oakland
C. Wilcox, CDFG, Yountville

APPENDIX G
AGENCY CONSULTATION LETTERS

APPENDIX G

Agency Consultation Letters

All pertinent agency letters received are not in this appendix. Agency letters commenting on the DEIS and responses to these letters are in Volume II, NEPA/404 consultation letters are in Appendix F.

List of Letters

Date	From	To	Subject
12/16/1996	U.S. Army Corps of Engineers	Caltrans	Aquatic disposal of dredged materials
3/11/1997	Federal Highway Administration	Caltrans	Lead federal agency
4/8/1997	Caltrans	CCSF, City of Oakland, others	Historic properties
4/29/1997	Federal Highway Administration	Caltrans	Lead agency status
5/19/1997	Coast Guard	Office of Historic Preservation	MOA for interim retrofit
6/12/1997	Mayor of San Francisco	MTC Bay Bridge Design Task Force	Future of the Bridge, connectivity, and impact on San Francisco
6/24/1997	U.S. Coast Guard	Office of Historic Preservation	Lead agency status
6/24/1997	U.S. Fish and Wildlife Service	U.S. Coast Guard	Section 7 Consultation
7/18/1997	Caltrans	City of Oakland	City of Oakland role in Section 106 process
7/21/1997	Mayor of San Francisco	MTC Bay Bridge Design Task Force	Transbay Terminal
8/13/1997	Office of Historic Preservation	Federal Highway Administration	Eligibility of historic properties
8/18/1997	Caltrans	National Marine Fisheries Service	Special status species list
8/18/1997	Caltrans	U.S. Fish and Wildlife Service	Special status species list
8/26/1997	National Marine Fisheries Service	Caltrans	Threatened/endangered species
8/29/1997	U.S. Fish and Wildlife Service	Caltrans	Threatened/endangered species
9/5/1997	Mayor of San Francisco	Governor, State of California	Treasure Island Development Authority

Date	From	To	Subject
9/5/1997	Mayor of San Francisco	Caltrans	Conveyance of Yerba Buena Island
11/1997	Mayor of San Francisco	Caltrans	Treasure Island/Yerba Buena Island ramps
11/21/1997	Navy for Caltrans	Native Americans	Request information on archaeological sites
12/17/1997	Caltrans	Mayor of San Francisco	Treasure Island/Yerba Buena Island ramps
1/14/1998	Oakland Landmarks Preservation Advisory Board	Caltrans	Historic properties
2/4/1998	Caltrans	National Marine Fisheries Service	Drilling impacts to endangered and threatened marine life
2/11/1998	Caltrans	Oakland Landmarks Preservation Advisory Board	Mitigation measures for historic properties
2/12/1998	Caltrans	City and County of San Francisco Planning Department	Disposal and reuse of Naval Station Treasure Island
5/13/1998	Mayor of San Francisco	MTC Bay Bridge Design Task Force	Transbay Transit Terminal replacement
6/11/1998	U.S. House of Representatives (Bay Area Members)	Metropolitan Transportation Commission	Bicycle lanes
6/12/1998	Caltrans	San Francisco Bay Conservation and Development Commission	Park at the Oakland Touchdown
6/15/1998	Caltrans	NAHC and Native American Monitor	Native American coordination
6/15/1998	U.S. Coast Guard	Caltrans	Temporary ramps on Yerba Buena Island
6/22/1998	Mayor of San Francisco	MTC Bay Bridge Design Task Force	Future development of Treasure Island and Yerba Buena Island
6/24/1998	Caltrans	CCSF	Historic studies
6/26/1998	Caltrans	Coast Guard	Historic studies
7/8/1998	U.S. Coast Guard	Caltrans	Cooperating agency status
7/16/1998	U.S. Navy	Caltrans	Drilling license for Yerba Buena Island
7/17/1998	Caltrans	Treasure Island Reuse Project	Water and sewer lines

Date	From	To	Subject
8/4/1998	Caltrans	CCSF, Navy	Effect evaluations for historic properties
8/10/1998	Port of Oakland	Bay Relations, Inc.	Southern alignment potential impacts
8/10/1998	State Senator Quentin Kopp	Metropolitan Transportation Commission	Rail service on the Bay Bridge
8/12/1998	U.S. Coast Guard	Caltrans	Coast Guard bridge removal policy
8/13/1998	Office of Historic Preservation	Federal Highway Administration	Historic properties
8/17/1998	Metropolitan Transportation Commission	State Senator Quentin Kopp	Rail service on the Bay Bridge
8/18/1998	Federal Highway Administration	Caltrans	Historic properties
8/19/1998	Caltrans	Office of Historic Preservation	Historic properties
8/21/1998	Office of Historic Preservation	Caltrans	Historic properties
9/1/1998	Caltrans	National Marine Fisheries Service	Potential for blasting during construction
9/10/1998	Office of Historic Preservation	Federal Highway Administration	Effects on historic properties
9/30/1998	Caltrans	City of Oakland	Systems to be installed on new East Span structure
10/23/1998	Caltrans	Bay Bridge Bicycle/ Pedestrian Advisory Committee	Interest group meeting #6
12/1/1998	Caltrans	Public agencies; preservation groups	Mitigation measures for historic properties
12/16/1998	Metropolitan Transportation Commission	Mayor of San Francisco	Legislative parameters for eastern span
12/28/1998	Caltrans	Local Mayors	Rail service on the Bay Bridge
12/30/1998	Caltrans Seismic Advisory Board	Senator Barbara Boxer	Soil explorations
1/20/1999	Caltrans	City of Oakland, CCSF, Navy, others	Mitigation measures for historic properties

Date	From	To	Subject
1/20/1999	National Marine Fisheries Service	Caltrans	Comments on Biological Assessment
1/21/1999	Caltrans	City of Oakland	SFOBB retrofit project performance comparison
1/26/1999	Congress of the United States	Jose Medina, Caltrans Director	Consensus on alignment
1/27/1999	Caltrans	Navy	Alternative-neutral MOA
2/16/1999	Coast Guard	Federal Highway Administration	MOA
2/18/1999	Navy	Caltrans	MOA
2/21/1999	CCSF's Treasure Island Project	U.S. Coast Guard	Coast Guard Station impacts
2/23/1999	U.S. Coast Guard	CCSF's Treasure Island Project	Impacts to Coast Guard facilities on YBI
3/1/1999	San Francisco Bay Conservation and Development Commission	CCSF's Treasure Island Project	Yerba Buena Island Reuse Plan
3/4/1999	CCSF's Treasure Island Project	San Francisco Bay Conservation and Development Commission	The Bay Plan
3/5/1999	Caltrans	Save San Francisco Bay Association	Replacement vs. retrofit
3/10/1999	Caltrans	Oakland Base Reuse Authority	Oakland Touchdown park
3/11/1999	San Francisco Bay Conservation and Development Commission	CCSF's Treasure Island Project	BCDC Staff Recommendations
4/1/1999	Port of Oakland	Caltrans	Radio Point Beach
5/7/1999	Caltrans	Native Americans	Native American coordination
5/10/1999	Mayor of San Francisco	Secretary Rodney Slater	Alexandria Historic Restoration and Preservation Commission v. USDOT
5/20/1999	FHWA	CCSF's Treasure Island Project	Report to the Council of Environmental Quality

Date	From	To	Subject
6/3/1999	U.S. Navy	Governor Gray Davis	Northern alignment concerns
6/10/1999	City of Oakland Council President	Supervisor Mary King, MTC	Oakland's desired features for the replacement bridge
6/22/1999	U.S. Coast Guard	Federal Highway Administration	Impacts to Coast Guard operations on Yerba Buena Island
6/23/1999	Supervisor Mary King, MTC	City of Oakland Council President	Oakland's desired features for the replacement bridge
7/13/1999	CCSF's Treasure Island Project	Secretary Contreras-Sweet	Legal and environmental issues associated with the northern alignment
8/26/1999	U.S. Coast Guard	U.S. Army Corps of Engineers	Access dredging
8/31/1999	U.S. Fish and Wildlife Service	Federal Highway Administration	Peregrine falcon
9/14/1999	CCSF's Treasure Island Project	Caltrans	Quarters 1-7 and the Naval Station Treasure Island Draft Reuse Plan
9/16/1999	Secretary Rodney Slater	Mayor of San Francisco	Alexandria Historic Restoration and Preservation Commission v. USDOT
9/23/1999	National Marine Fisheries Service	Federal Highway Administration	Living marine resources and habitats consultation
10/14/1999	Caltrans	CCSF and City of Oakland	Effects evaluations and mitigation measures for historic properties
10/20/1999 10/21/1999	Federal Highway Administration	Office of Historic Preservation, ACHP, Navy, Coast Guard	Effects evaluations and mitigation measures for historic properties
10/28/1999	East Bay Municipal Utility District	Caltrans	Maintenance issues for EBMUD outfall
11/8/1999	Senator Dianne Feinstein	Governor Gray Davis	Interim retrofit, accommodation of rail, and increasing trans-bay crossing capacity.
11/19/1999	Office of Historic Preservation	Federal Highway Administration	Effect evaluations for historic properties

Date	From	To	Subject
2/3/2000	Office of Historic Preservation	Federal Highway Administration	MOA
2/4/2000	San Francisco Bay Conservation and Development Commission	Caltrans	Consistency Determination
2/18/2000	Navy	Federal Highway Administration	Role of CCSF in MOA
2/29/2000	Federal Highway Administration	U.S. Navy	Role of CCSF in MOA
2/29/2000	California Transportation Commission	U.S. Navy	Navy cooperation
3/21/2000	U.S. Navy	California Transportation Commission	CCSF's exclusion from the East Span Safety Project
3/28/2000	U.S. Navy	Federal Highway Administration	Role of CCSF in MOA
4/19/2000	ACHP	Federal Highway Administration	MOA
5/19/2000	Federal Highway Administration	Navy	MOA and land transfer
5/26/2000	Federal Highway Administration	Office of State Historic Preservation	Maritime archaeology
6/6/2000	Office Of Historic Preservation	Federal Highway Administration	Maritime archaeology
6/13/2000	Federal Highway Administration	Caltrans	Maritime archaeology
6/23/2000	Federal Highway Administration	Navy, CCSF, City of Oakland, Native Americans	Requests concurring party signatures on MOA
7/26/2000	City of Oakland	Federal Highway Administration	Objections to MOA
8/4/2000	U.S. Navy	Federal Highway Administration	MOA
8/8/2000	Department of Fish and Game	Caltrans	Review of the Biological Assessment
9/25/2000	Federal Highway Administration	City of Oakland	MOA

Date	From	To	Subject
10/31/2000	Department of the Army	Caltrans	Sediment test results
12/7/2000	Ad Hoc Committee on Seismic Ground Motion	Joseph Nicoletti, Chairman of EDAP	Review of U.S. Army Corps of Engineers Final Report
12/21/2000	BCDC	Caltrans	Bridge railing height on bicycle-pedestrian path
1/22/2001	Caltrans	Army Corps of Engineers and Environmental Protection Agency	Conceptual Mitigation Plan for Special Aquatic Sites
2/14/2001	Caltrans	Army Corps of Engineers	Transmit Administrative FEIS and responses to Corps' comments on DEIS
2/14/2001	Caltrans	Environmental Protection Agency	Transmit Administrative FEIS and responses to EPA's comments on DEIS
2/14/2001	Caltrans	United States Coast Guard	Transmit Administrative FEIS and responses to USCG's comments on DEIS
2/27/2001	Caltrans	Navy	Transmit responses to Navy's comments on DEIS
3/22/2001	NMFS	Caltrans	Response to request for updated endangered species list
3/26/2001	USFWS	Caltrans	Response to request for updated endangered species list

EXHIBIT L

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

DEC 16 1996

REPLY TO
ATTENTION OF:

Regulatory Branch

SUBJECT: File Number 22138S

Mr. Kenneth Terpstra
Project Manager
California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

Dear Mr. Terpstra:

The U.S. Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, San Francisco Bay Regional Water Quality Control Board, and the Corps of Engineers, have completed their review of the sediment test results for the approximately 262,000 cubic yards of sediments proposed to be dredged for the San Francisco-Oakland Bay Bridge Seismic Retrofit Project in San Francisco and Alameda Counties, California as presented in the report prepared by Clayton Environmental Consultants entitled "Sediment Sampling and Results, San Francisco-Oakland Bay Bridge, East span, Seismic Retrofit Project" dated November 1996.

The members of the above inter-agency group are recommending to their respective agency's management that the material proposed for dredging from all piers EXCEPT Pier E-23, as characterized in the above report, is suitable for aquatic disposal at the Alcatraz Dredge Material Disposal Site (SF-11). The test results show that the material from Pier-23 contains elevated levels of some metals, particularly lead. The inter-agency group suggests that this material be removed to an approved upland disposal site or that additional tests be conducted on the archived material from Pier-23. Should you choose to conduct additional tests, please contact Mr. Rob Lawrence of the Corps of Engineers at (415) 977-8447 to discuss the details of additional tests.

Please be advised that this letter does not constitute an authorization to proceed with your dredge project. You must first obtain Federal, State and local permits as appropriate.

Should you have any questions please call Mr. Rob Lawrence. If you wish to write, please address all correspondence to the District Engineer, Attention: Mr. David Dwinell Construction-

Operations Division, and refer to the file number at the head of this letter.

Sincerely,

Max R. Blodgett
Chief, Construction-Operations
Division

Copies Furnished:

US EPA, San Francisco, CA, Attn: Hoffman
CA BCDC, San Francisco, CA, Attn: Goldbeck
CA RWQCB, Oakland, CA, Attn: Gandesbery
CA SLC, Sacramento, CA, Attn: Howe
CA F&G, Menlo Park, CA, Attn: Tasto
US NMFS, Santa Rosa, CA, Attn: Butler

U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator
400 Seventh St., S.W.
Washington, D.C. 20590

March 11, 1997
Refer to: HPD-1

Mr. James W. van Loben Sels
Director, California Department
of Transportation
P.O. Box 942873
Sacramento, CA 94273-0001

Dear Mr. van Loben Sels:

Thank you for your February 20 letter to Secretary of Transportation Rodney E. Slater regarding the lead Federal Agency for replacement of the eastern span of the San Francisco-Oakland Bay Bridge.

Recognizing the importance of designating the appropriate lead Federal Agency, Mr. Eugene W. Cleckley of my office and Mr. Nick Mpras of the United States Coast Guard (USCG) have discussed your recommendation. On the Secretary's behalf, I am pleased to let you know that based on these discussions, the FHWA will be the lead Federal Agency.

We have informed FHWA Division Administrator David H. Densmore of this decision. He and his staff will work closely with you to ensure the project is developed in accordance with Federal requirements, including those under the jurisdiction of the USCG.

Sincerely yours,

Anthony R. Kane
Executive Director

OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

ARTMENT OF TRANSPORTATION
7660
ID, CA 94623-0660
96-4444
1) 286-4454

April 8, 1997

Bay Bridge Seismic Retrofit
04-SF-80, P.M. 4.9 / 8.9
04-Ala-80, P.M. 0.0 / 1.3

Mr. Bill Coburn, Director
Oakland Heritage Alliance
P. O. Box 12425
Oakland, California 94612

Dear Mr. Coburn:

As you are probably aware, the California Department of Transportation (Caltrans) is planning seismic retrofit work on the San Francisco - Oakland Bay Bridge, a civil engineering landmark that is eligible for listing on the National Register of Historic Places. One of the options being considered is the construction of an entirely new East Bay span, between Oakland and Yerba Buena Island. Several alternative bridge designs have been proposed for this new structure. The Federal Highway Administration (FHWA) will be the lead federal agency for this undertaking, which is subject to review by the State Historic Preservation Officer (SHPO) pursuant to Section 106 of the National Historic Preservation Act.

We invite your comments on this undertaking and its effect on the historic bridge, in accordance with the "public participation" provisions of the regulations implementing Section 106 [36 CFR 800.1(c), et. al.] We are particularly interested in your ideas and suggestions for practical and appropriate mitigation measures, specifically related to impacts to the historic bridge, if the decision is made to replace the existing East Bay spans with a new structure. Caltrans has already committed to photographic recordation of the bridge to Historic American Engineering Record (HAER) standards. Copies of all comments received will be forwarded to the SHPO for her consideration in the review of this project.

We are also enclosing a schedule of public meetings for your information. If you have any questions or would like more information, please contact Mara Melandry at (510) 286-5582.

Sincerely,

HARRY Y. YAHATA
District Director

By

Mara Melandry

for ROBERT GROSS
District Office Chief
Office of Environmental Planning, South

cc: Hans Kreutzberg, Office of Historic Preservation
Lee Keating, Advisory Council on Historic Preservation

Historic Preservation Groups
to receive letter from Caltrans on the possible new
east span of the San Francisco - Oakland Bay Bridge

1. Mr. Charles Cavanagh, Chair
   American Society of Civil Engineers,
   History and Heritage Committee
   708 Carolan Avenue
   Burlingame, California 94010

2. Mr. Anthony Bruce
   Berkeley Architectural Heritage Association
   2318 Durant Avenue
   Berkeley, California 94701

3. Mr. Jeff Eichenfeld, Director
   California Preservation Foundation
   405 Fourteenth Street, Suite 1010
   Oakland, California 94612

4. Mr. David Bahlman, Executive Director
   Foundation for San Francisco's Architectural Heritage
   2007 Franklin Street
   San Francisco, California 94109

5. Ms. Denise LaPointe, President
   Landmarks Preservation Advisory Board
   c/o Planning Department
   City and County of San Francisco
   1660 Mission Street, 5th Floor
   San Francisco, California 94103 - 2414

6. Ms. Kathryn A. Byrnes, Director
   National Trust for Historic Preservation
   Western Regional Office
   1 Sutter Street, Suite 707
   San Francisco, California 94104

7. Mr. Gary Knecht, Coordinator
   Oakland Cultural Heritage Survey
   City of Oakland, Planning Department
   1330 Broadway, Suite 310
   Oakland, California 94612

8. Mr. Bill Coburn, Director
   Oakland Heritage Alliance
   P.O. Box 12425
   Oakland, California 94612

MAY 1 1997

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

ARIZONA
CALIFORNIA
NEVADA
HAWAI'I
GUAM
AMERICAN SAMOA
N. MARIANA IS.

April 29, 1997

IN REPLY REFER TO
HA-CA
File #:04-SF-Ala-80
Document #: P11061

EXECUTIVE OFFICE
97 APR 31 PM 2:04

Mr. Harry Yahata, District Director
Caltrans, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Attention: Denis Mulligan

Dear Mr. Yahata:

SUBJECT: CONFIRMATION OF AGREEMENT AS LEAD AGENCY FOR SFOBB

This is in response to your April 14, 1997, letter to confirm the agreements reached regarding seismic work on the San Francisco-Oakland Bay Bridge (SFOBB). In general, the FHWA agreed to be the lead federal agency for NEPA purposes if there is a federal action required. However, if no federal action is anticipated, Caltrans is to clear the project under the State laws. Our understanding for the FHWA involvement is as follows:

The East Span retrofit (new structure) will require a Federal action. Accordingly, we agreed to be the lead federal agency for the project.

The West Bay Span, if there is a federal action. We will work with your staff to determine the level of NEPA documentation.

The West Bay Approach from 5th Street to the San Francisco anchorage, as you have indicated, has no federal involvement. We concur and we encourage you to proceed on that basis.

We are looking forward to working with you and your staff on the SFOBB projects. If you have any questions, please contact Mr. John Schultz, Chief, District Operations North or Bill Wong, Senior Transportation Engineer at (916) 498-5041/5042.

Sincerely,

John R Schultz

For
David H. Densmore
Division Administrator

RECEIVED
MAY 8 - 1997
B. QUAN

DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-2402

IN REPLY REFER TO:

5090.1B
185LW/EP-1282

MAY 19 1997

Mr. Wayne R. Till
Chief, Bridge Section
Eleventh Coast Guard District
Bldg. 50-6
Coast Guard Island
Alameda, CA 94501-5100

Dear Mr. Till:

We appreciate the briefing you arranged on April 3, 1997 with the California Department of Transportation (CALTRANS) on our behalf to explain the interim seismic modifications required by the east section of the San Francisco-Oakland Bay Bridge until a replacement bridge can be designed and constructed connecting Oakland to Yerba Buena Island. Mr. Louis Wall, who represented the Navy at that meeting has briefed me on the revised modifications as currently planned and has informed us that the Federal Highway Administration (FHWA) will be the lead agency in preparing the Environmental Impact Statement for the proposed replacement bridge project. He also has advised that Mr. John Schultz, District Engineer, California Division, FHWA, who also was in attendance, stated that the concerns raised by the Navy in our previous correspondence with respect to the impacts of noise, construction and traffic generated, vibrations and restrictions to the continued use of the historic properties on Yerba Buena and Treasure Island would be fully addressed in the EIS, and that FHWA would initiate a separate review pursuant to Section 106 of the National Historic Preservation Act for the bridge replacement project.

From the information provided at the briefing it appears that the interim seismic retrofit project should not adversely affect Quarters 1 or any of the other historic properties on Yerba Buena Island. Nor should they affect the continued use of the historic buildings on Treasure Island. Nevertheless, we are reluctant to sign the Memorandum of Agreement (MOA) prepared pursuant to the regulations implementing Section 106 of the National Historic Preservation Act, forwarded to us by your letter of January 10, 1997. That MOA accepted the adverse effects of the seismic retrofit project as then designed on these historic properties and required actions to mitigate anticipated adverse effects which for the most part are no longer appropriate.

We are not adverse to participating in this process and are willing to sign a MOA revised to address the currently proposed retrofit project. This would require changing the first "WHEREAS" clause to make it clear that the undertaking is the permanent retrofit of that portion of the bridge between San Francisco and Yerba Buena Island, and only an interim retrofit of that portion of the bridge that spans the Bay from Oakland to Yerba Buena Island. The second "WHEREAS" requires editing as well, because it appears that as revised the undertaking will not affect Quarters 1. It is also suggested that the phrase ", and the Navy has consulted in accordance with applicable

provisions of Section 110 of the same Act (16 U.S.C. 470h-2)" in this "WHEREAS" be deleted because we have not. With respect to the "STIPULATIONS," number "II" should be deleted as it is no longer applicable. Stipulation III. B. requires reworking to delete reference to those modifications no longer planned for the eastern side on Yerba Buena Island. Stipulation IV.D. refers to "Stipulation IX" and this number should change when Stipulation II is deleted. The instruction to "promptly notify the Navy" in Stipulation IV.D. is overly vague and should be made more specific. Should such unanticipated discoveries be found, CALTRANS should contact the "Officer In Charge in the Caretaker Site Office, Naval Station Treasure Island and the Environmental Planning Branch, Engineering Field Activity, West, San Bruno." Lastly, we noted a typo at the end of the third line of Stipulation VII. where "in" should read "is".

Enclosed is the original MOA forwarded with your January 10 letter. If you have any questions about the proposed revisions, please call Mr. Wall at (415) 244-3015. We look forward to receiving the revised MOA.

Sincerely,

KENN Y. PARSONS
Base Conversion Manager
Naval Station Treasure Island

Enclosure

Copy to:
John R. Schultz, FHWA, Sacramento
Steven L. Hulsebus, Caltrans, Oakland
Mara Melandry, Caltrans, Oakland

ATTACHMENT #3

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

June 12, 1997

Honorable Mary King
Chairperson
Bay Bridge Design Task Force
Metropolitan Transportation Commission
101 Eighth Street
Oakland, CA 94607-4700

Dear Supervisor King:

Thank you for serving as Chair for the Bay Bridge Design Task Force. I appreciate the effort that MTC and Caltrans have put into this aggressive review and study period. I am taking the liberty of writing the Task Force with my thoughts regarding the future of the Bridge, its connectivity to the region and its impact on San Francisco.

As you know, San Francisco views the Bay Bridge in its totality, not just the eastern span. Efforts should be made to support the retrofit of the western approach ramps, redesign of the access to Yerba Buena Island and Treasure Island, as well as the incorporation of the new regional terminal which will help relieve future congestion on the new span and the transbay corridor.

Last month City staff presented to your Committee information regarding the replacement of the state-owned Transbay Transit Terminal, which is historically linked to the Bay Bridge. The Terminal has been part of the Bridge since its inception, toll revenues paid for its construction, and continue to pay for its operation and maintenance. Caltrans, faced with seismic and life safety concerns regarding the future of the terminal, came to the City for assistance in planning a replacement facility. The City of San Francisco, working with the regional transit operators, MTC and Caltrans has developed a replacement terminal proposal. This proposal was endorsed by the San Francisco Board of Supervisors last month and is moving into project design and environmental review. I am attaching a copy of a letter I sent to the President of AC Transit's Board of Directors outlining the history of this project.

The primary user of the Transbay Transit Terminal is AC Transit, which enjoys exclusive ramp access from the Bridge to the Terminal. This dedicated access allows for efficient, convenient transbay access from the East Bay. This exclusive access will continue as part of the replacement terminal to be located between Main and Beale Streets at Howard Street.

401 VAN NESS AVENUE, ROOM 336, SAN FRANCISCO, CALIFORNIA 94102
(415) 554-6141

Access to and from the Bridge should also be considered in your final analysis on the Bridge. I know there are efforts to retrofit and or replace the western approach ramps, which include the terminal ramps, leading to and from the Bridge in San Francisco. The coordination of this project as it relates to the rebuilding of the Terminal Separator Structure should be encouraged. However, I believe the greatest deficiency is related to the auto ramps linking the Bridge with Treasure Island and Yerba Buena Island (TI/YBI). From an operational and life safety standpoint, I assume these ramps are sub-standard. One cannot in good conscience allow the bridge to be retrofitted and do nothing to improve how vehicles get on and off the Island. The Task Force should support the additional costs required to assure safe and convenient traffic movement between the Bridge and TI/YBI.

The alignment of the eastern span onto Yerba Buena Island is also critical to us as we take possession of the Island from the Navy this fall. The proposed Northern alignment precludes development of most of the flat, developable land on Yerba Buena Island. Reuse of existing buildings and redevelopment of this area is critical to providing revenue to fund redevelopment of Treasure Island, where seismic safety issues and Tideland Trust restrictions impose higher costs for redevelopment. For this reason, along with the increased cost for the replacement span, I am against the Northern alignment. The Southern alignment preserves these immediately developable opportunities, reduces negative visual and noise impacts from the existing Bridge, and costs less.

I hope that you find this information helpful in your deliberations regarding the new Bay Bridge design. I offer my good offices to assist you in obtaining additional funding for those proposals endorsed by your Task Force. Thank you for allowing me the forum to comment.

Sincerely,

Willie L. Brown, Jr.
Mayor

WLB/s2

U.S. Department of Transportation
United States Coast Guard

Commander (Pow-2)
Eleventh Coast Guard District

Coast Guard Island
Alameda, CA 94501-5100
Staff Symbol: (Pow-2)
Phone: (510) 437-3514
FAX: (510) 437-5836

16591
San Francisco Bay (8.9)
Ser: 318-97
Date June 24, 1997

Hans Kreutzberg
Deputy State Historic Preservation Officer
P.O. Box 2390
Sacramento, CA

Dear Mr. Kruetzberg:

This is to notify you of a change in the nature of activities involved in the seismic retrofit efforts at the San Francisco-Oakland Bay Bridge (SFOBB), and a change in responsible federal agency.

First, as you know, the Governor of California has decided to replace rather than retrofit the east bay portion of the SFOBB. Although some minor retrofit activities will be conducted at the east bay spans, the retrofit work there should have no significant effect on the historic character of the bridge or properties in the historic district on Treasure Island. Accordingly, the MOA which we submitted on November 29, 1996 needs to be revised to reflect the change in the scope of work.

Second, the Coast Guard has determined that a bridge permit will not be required for the seismic retrofit work, thus there remains no Coast Guard undertaking with this project, and it is no longer appropriate for us to serve as the federal coordinator.

In accordance with our agreement with the Federal Highway Administration, they will serve as lead federal agency for both the seismic retrofit and the east bay span replacement project.

Since the east bay span replacement project will require a Coast Guard bridge permit, we will serve as a cooperating agency in the environmental review processes.

If you have any questions concerning this letter, please call me at (510) 437-3516.

Sincerely,

W. R. TILL
Chief, Bridge Section
U. S. Coast Guard
By direction of the District Commander

Copy: FHWA, USN, ACHP, Caltrans 04

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:

1-1-97-F-107

June 24, 1997

Mr. W.R. Till
Chief, Bridge Section
U.S. Coast Guard
Bldg. 50-6 Coast Guard Island
Alameda, CA 94501-5100

Subject: Formal Section 7 Consultation on the Oakland Bay Bridge Seismic Retrofit, San Francisco and Alameda Counties, California

Dear Mr. Till:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on the Service's review of the proposed Oakland Bay Bridge (Bridge) seismic retrofit and related activities, and its effects on the endangered American peregrine falcon (*Falco peregrinus anatum*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act). Your request for formal consultation was received on January 3, 1997.

This biological opinion is based on information provided in the November 7, 1996, biological assessment (BA) prepared by Caltrans (1996), personal communications with Brian Walton of the Santa Cruz Predatory Bird Research Group (SCPBRG), the final rule listing the peregrine falcon (35 CFR 16047), the proposed rule to delist the species (50 CFR 34406), and the Recovery Plan for the Peregrine Falcon (USFWS 1982). A complete administrative record of this consultation is on file in this office.

BIOLOGICAL OPINION

Description of the Proposed Action

The U.S. Coast Guard proposes to authorize the California Department of Transportation (Caltrans) to proceed with a seismic retrofit of the Oakland Bay Bridge. The seismic retrofit will occur through 21 individual projects, as described in the biological assessment. The projects are grouped into units: east bay, west bay, and the west bay approach. Project 1, at the east bay approach, is currently under construction. Project 11 is at the west bay approach and is completed. Project 21 has been included in Project 3. This biological opinion addresses the remaining 18 projects. In summary, the remaining projects that may affect the peregrine falcon involve foundation work on the footings of several piers and work on the superstructures, road beds and footings of over-water portions of the bridge. For a complete description of project activities, refer to the biological assessment (Caltrans 1996).

Project impacts will be minimized by implementing a construction restraint from February through mid-June. In addition, any peregrine falcon chicks will

be removed by the SCPBRG. Chicks will be reared and released elsewhere. Activities will avoid a 300 foot distance from the actual nest locations.

Species Account and Environmental Baseline

The American peregrine falcon was federally listed as endangered in 1970 (35 FR 16047). The following is a discussion of peregrine falcon biology, population status and trends. For further information refer to the *Pacific Coast Recovery Plan for the American Peregrine Falcon* (USDI 1982)

As stated in the *Pacific Coast Recovery Plan for American Peregrine Falcon* (USDI 1982), American peregrine falcons nest almost exclusively on cliffs, usually near water. Preferable sites are sheer cliffs 150 feet or more in height. The cliff usually has a small cave or overhung ledge large enough to contain three or four full-grown nestlings. Several holes or ledges that can be used in alternate years are apparently not an absolute requirement, but probably increase the suitability of the cliff. Peregrines have nested from sea level to over 11,000 feet, anywhere suitable cliffs are found, except in the desert.

Bridges and tall buildings have become surrogate cliffs and are utilized by peregrine pairs for nesting, roosting and foraging (Hickey and Anderson 1969). Peregrines' use of bridges includes (1) year round occupation, with the bridges used as hunting perches, night roosts, perches to escape inclement weather, or other perching, (2) nesting by pairs from 1 February through 31 July, and (3) irregular occupation by immature peregrines, "floating" adults seeking vacant territories, or wintering migrants from northern populations (Walton 1997). In the case of nesting pairs, no nest is built by the falcons; eggs are laid in debris on ledges or in cavities (Walton 1997). Nest sites are almost invariably below the roadway, and often on the portion of the bridge that is highest above the water. These latter "sites" can be repeated many times on any one bridge. Typically, only one pair will occupy a bridge (Walton 1997).

Peregrines compete with other raptors and ecologically similar birds for cliff nests. For example, golden eagles (*Aquila chrysaetos*), red-tailed hawks (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), turkey vultures (*Cathartes aura*), and ravens (*Corvus corax*) all nest in similar situations and may even use abandoned peregrine eyries. Peregrines defend the nesting territory vigorously against intrusion by some of these species. It is not clear, however, if this is a response to nest-site competition or is a response of perceived threats to adults or young.

Availability of nest sites may be a limiting factor in some areas. For example, peregrines historically nested all along the coast in southern California. Today, houses and other buildings are located on the tops of these sea cliffs, and recreation abounds in their vicinity to such an extent that few suitable nesting areas remain. Partly as a result of this, peregrine falcons currently do not nest along the coast from near Santa Barbara south to the Mexican border. Further loss of historical peregrine nest sites could limit recovery of the species in some areas.

Foraging areas are associated with each nest territory. This generally includes wooded areas, marshes, open grasslands, coastal strands and bodies of water. The peregrine falcon is a diurnal raptor that feeds almost entirely on small birds. Wooded areas near water attract a diverse avifauna, and bodies of water provide open areas where prey cannot easily escape attack. Marshes, savannas, and shorelines are also common foraging areas. Loss of foraging

areas through modification of habitat may be a problem. In many areas human encroachment has caused nests to be abandoned, but it is difficult to separate the effects of habitat loss from the effects of disturbances to the birds themselves.

The species suffered a dramatic population crash in the 1960s correlated with the introduction and use of organo-chlorine pesticides in the middle and late 1940s. About 220 historical eyries were known in California. By 1970, only four nesting locations in California were active. By the mid 1970s, the remaining core population in the State was estimated to be 20 to 30 pairs in the inner north coastal ranges, with 5 to 10 pairs distributed throughout the rest of the State.

A Recovery Plan for the species was adopted in 1982. Under the plan, the first phase allowed various techniques to be used to increase the peregrine falcon populations. In the San Francisco Bay Area, researchers from the SCPBRG coordinated egg removals, fostering, cross fostering and captive breeding efforts. American peregrine falcons in the western United States have re-expanded in recent decades. In 1992, 113 pairs were known in California, most of which occurred in the northwestern portion of the State. On June 30, 1995, the Service published an advance notice of a proposal to remove the American peregrine falcon from the list of Endangered and Threatened wildlife (50 FR 34406); according to this notice, the current total for the Pacific population stands at approximately 224 pairs.

There are currently several pairs of peregrine falcons within the vicinity of the Oakland Bay Bridge. The Dumbarten Bridge supports nesting peregrine falcons (B. Walton, pers. comm., 1997), peregrines have been observed utilizing the Hayward-San Mateo Bridge for perching and foraging, and nesting attempts have been documented at the Richmond-San Rafael Bridge (Caltrans 1997). The Oakland Bay Bridge has two pairs of nesting peregrine falcons; one pair nests on the west bay spans and another pair nests on the east bay side. The biological assessment provides nest histories of both pairs from the 1980s through the 1996 breeding season (Caltrans 1996).

Effects of the Action

A review of the literature indicates that disturbance can negatively affect avian productivity. Specifically, studies on waterfowl, colonial seabirds and raptors have shown that disturbance can cause nest abandonment, egg mortality due to exposure from flushing, increased predation of eggs and hatchlings, depressed feeding rates, increased adult energy demands, or avoidance of otherwise suitable habitat (Anderson and Keith 1980, Burger 1981, Pierce and Simons 1986, Knight and Skagen 1988, Henson and Grant 1991). Recurring disturbance, such as annual events, may cause a shift in breeding activity over time. Individuals that succeed in their reproductive efforts in spite of noise disturbance may not return to the same successful location the following year due to anticipated disturbance.

The use of motorized equipment during the breeding season within one half mile of suitable nesting habitat has the potential to disrupt essential breeding behaviors by: (1) causing abandonment of the breeding effort by failure to initiate nesting; (2) copulation disturbances resulting in infertile eggs; (3) causing abandonment of the breeding effort by failure to complete incubation; (4) egg breakage or death; (5) death of young in the nest because of inability to thermoregulate; (6) disrupting nesting activities such as feeding young; (7) causing premature fledging and dispersal of juveniles;

(8) stress to adults resulting in less hunting and starvation of young; and
(9) various other impacts.

The effects of disturbances on peregrine falcons vary with the timing of the disturbance and the proximity to the eyrie. The peregrine falcon is particularly sensitive to disturbance near the nest cliff during the breeding season. In early spring during courtship, disturbed birds are particularly liable to desert an area. Part of the male's courtship ritual involves ledge displays to attract a female to a particular ledge for use as a nest site (Nelson 1970). The female will accept or reject the ledge, and it is believed that this is based largely on the protection from predators the ledge offers. If disturbance occurs near the ledge, the female will often reject the ledge and search for a better one. If human activities are centered generally throughout the nesting area, the entire territory may be abandoned, and the pair may not nest (Hickey 1942, Bond 1946, Fyfe and Olendorff 1976). Peregrines have abandoned their nest ledges after a single short visit by a human before or during egg laying (Fyfe and Olendorff 1976).

After the eggs are laid, the parents are less likely to abandon their nest, but many still do so. After the eggs hatch, but before the young fledge, the parents are most likely to "sit tight" and defend the nest vigorously rather than abandon it. Another critical period occurs just prior to fledgling by the young. Disturbance at the nest may cause the nestlings to fledge prematurely, which may result in injury or death, or expose them to predators.

The birds utilizing San Francisco Bay area bridges, such as the Oakland Bay Bridge, may be accustomed to higher levels of noise disturbances than other birds nesting within the range. However, the construction activities are expected to increase noise levels and visual distractions to a higher degree than that associated with typical road and boat traffic. Disturbances to peregrine falcons on the Oakland Bay Bridge have been documented in association with past bridge repair work. The pairs on the bridge have defended their nest areas, during their reproductive period, by mobbing intruders and vocalizing. Disturbances other than retrofit activities, such as bridge inspections, maintenance and painting are continuous and therefore, represent a high degree of disturbance to the birds. Other retrofit construction projects (i.e., Richmond-San Rafael Bridge, Hayward-San Mateo Bridge) occurring simultaneously within the San Francisco Bay area may increase the cumulative effects on peregrine falcons.

Peregrines rarely return to their own nest to breed with their parents or siblings, instead most move 10 to 250 miles and breed with unrelated birds (Walton 1997). Thus, falcons coming to California bridges in the future are unlikely to be offspring fledged from nests on the bridge being impacted. This means that the productivity of an individual bridge is not critical to continued occupancy of that specific territory or bridge. Hence, bridges have remained occupied now for many years despite higher than normal mortality of fledglings that occurs because of drowning and car collisions. For this reason, moving broods to hack sites has been suggested by some biologists as a way to salvage young peregrines and allow them to fledge under safer conditions.

Hacking of peregrine falcons, as committed to by Caltrans via their contract with the SCPBRG, will greatly enhance peregrine productivity and re-occupancy of many areas of historic range in California. According to Walton (pers. comm. 1997), almost all birds on buildings and bridges initially came from these releases, although currently most falcons come from wild nests. In

addition to hacking of young birds, the limited operating period and 300 foot avoidance zone will further minimize the effects of incidental take.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur within the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Conclusion

After reviewing the current status of the American peregrine falcon, the environmental baseline, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the seismic retrofit of the Bridge, as proposed, is not likely to jeopardize the continued existence of the peregrine falcon. This determination is based on implementation of the conservation measures to minimize harm that are outlined in your biological assessment.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

Amount or Extent of Take

The Service has determined that incidental take of reproduction associated with the peregrine falcon territories within the vicinity of the Bridge is likely to occur throughout the project duration (3 years). The Service estimates that all progeny from one nesting pair of peregrine falcons will be subject to take in the form of harm, harassment, or capture for a period of three years.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the American peregrine falcon or a reduction of opportunity for recovery of the species.

Reasonable and Prudent Measures

The Service determines that no reasonable and prudent measures are necessary to minimize the impact of incidental take of peregrine falcons. The Coast Guard, however, has a continuing duty to regulate the activity covered by this incidental take statement. If the Coast Guard fails to require the applicant to adhere to the measures proposed in the project description, the protective coverage of section 7(o)(2) may lapse.

Reporting Requirements

The Service has an established protocol for the handling and analysis of dead, sick or injured listed species. Any dead or injured peregrine falcons must be reported to the Service's Law Enforcement Division (916/979-2986) within 24 hours, and turned over as soon as possible to the Law Enforcement Division or to a game warden or biologist of the California Department of Fish and Game for care or analysis. The Service is to be notified in writing within three working days of the accidental death of, or injury to, any peregrine falcon, or of the finding of any dead or injured peregrine falcon during construction operations. Notification must include the date, time, and location of the incident or discovery of a dead or injured peregrine falcon, as well as any pertinent information on circumstances surrounding the incident or discovery. The Service contact for this written information is the Field Supervisor (916/979-2710).

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the actions as outlined in the U.S. Coast Guard's December 26, 1996, request. The incidental take permitted in accordance with this project is authorized through the breeding season of 2000. Any maintenance activities anticipated after will require reinitiation of consultation on this project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have questions regarding this response, please contact Ms. Ina Pisani at (916)979-2725.

Sincerely,

Dale A. Pierce

for Wayne S. White
Field Supervisor

cc: AES-Portland, OR (Div. of Consultation & Conservation Planning)
Caltrans, Oakland, CA ATTN: Chuck Morton

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ARTMENT OF TRANSPORTATION
360
AND, CA 94623-0660
4444
286-4454

July 18, 1997

Helaine Kaplan-Prentice, Secretary
Landmarks Preservation Advisory Board
One City Hall Plaza
Oakland, Ca 94612

Dear Ms. Prentice:

Thank you for the opportunity to present information about the proposed new East Bay span of the San Francisco-Oakland Bay Bridge at the Board's meeting on July 14, 1997.

The purpose of this letter is to clarify the role of the Board in the compliance process with the National Historic Preservation Act. While Caltrans welcomes comments at any time during the environmental process, in the Section 106 process there are specific times at which the Board may comment and certain times by which the Board would need to comment. In general, the Board would need to comment within 30 days after receiving a report or a request to comment from Caltrans.

Specific times when Caltrans will solicit formal comments are the following:

1. Identification of historic properties to be described in a report entitled Historic Property Survey Report (Due January 1998).
2. Evaluation of project effects on historic properties to be described in a report entitled Finding of Effect Report (Due January 1998). Prior to this time, Caltrans would appreciate suggestions on mitigation measures.
3. Draft environmental impact statement (Due November 1998).
4. In addition, any ideas the Board can provide on measures to mitigate adverse effects on historic properties will be appreciated, with the understanding that the actual mitigation measures finally adopted need to be financially feasible, tied to the specific impacts on the specific significant historic resources, and agreed to by the State Office of Historic Preservation, the Advisory Council on Historic Reservation, Caltrans, and Federal Highways Administration.

We hope that to meet with you again in the future, after Caltrans has assessed project effects.

Again, we appreciated the opportunity to meet with the Board. If you have any questions, please call me at 510-286-5582.

Sincerely,

HARRY Y. YAHATA
District Director

By Mara Melandry
MARA MELANDRY
Office of Environmental Planning, South

Cc: California Preservation Foundation (Jeff Eichenfeld)

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

July 21, 1997

The Honorable Mary V. King
Chair, MTC Bay Bridge Design Task Force
101 Eighth Street
Oakland, CA 94607-4700

Dear Supervisor King:

Thank you for allowing me this opportunity to provide additional information to the Task Force as its completes its deliberative process to develop the region's recommendation to the State Legislature on the future of the Bay Bridge.

The proposed replacement of the Transbay Terminal at the west end for the Bay Bridge is, in my judgment, a critical and integral element of the future of the Bay Bridge since it will insure that future AC Transit transbay service can be sustained and expanded, thus diminishing the level of automobile trips on the Bridge. San Francisco is at this time advancing the new terminal project to the engineering and design phase, based on a preliminary concept for the new terminal which has been accepted by all parties involved in the planning.

The current cost estimate for the new regional transit terminal is $125 million, a figure which is exclusive of the ramp work which will link the terminal to the Bridge. In order to meet this financial requirement, San Francisco and its funding partners will examine a wide range of funding sources, but it is very apparent that the most important potential source is the Bridge toll increase revenues. I believe that we need a minimum of $80 million from this source in order to assure a viable financing package for the new terminal.

Beyond this principal funding source, we will examine a variety of federal, state and local resources to meet the total funding needed. Sources we are currently examining include Caltrans seismic funds (for demolition), NEXTEA and STIP financing, as well as San Francisco Redevelopment tax increment funds. We will be working with Caltrans and the MTC in developing this financing package, but it is apparent that a modern new regional terminal must secure substantial Bridge toll revenues if it is to be realized without significant disruptions to the capital financing plans of regional transit operators.

I also believe that the concept of building a new span and retrofitting the Bridge will be totally lost if we do not improve the safety situation leading to and from Treasure and Yerba Buena Islands. These ramps have to be considered an operational safety hazard and we would be remiss in our duties as elected, or appointed, officials if we allowed the

401 VAN NESS AVENUE, ROOM 336, SAN FRANCISCO, CALIFORNIA 94102
(415) 554-6141

Bridge to be improved, but did nothing to improve the access. If you do not want to use the toll increase to pay for the improved ramp system, it is incumbent upon the MTC to develop an acceptable solution prior to submitting the region's preference to Sacramento.

As for the alignment and design of the Bridge, I feel that we have an incredible opportunity to make a defining statement with the eastern span. The arguments of a southern alignment versus a northern alignment have to be weighed with the impact each alignment has on either Yerba Buena Island or the Port of Oakland. It is my feeling that the economic development opportunities to the Port of Oakland outweigh the economic opportunities to San Francisco at Yerba Buena Island. Even though it will cost more money to build a signature Bridge, I am willing to support the efforts of the majority of this task force to support the northern alignment.

I hope that you take this all under careful consideration as you advance your recommendation to MTC and to Sacramento.

Thank you for allowing me another opportunity to comment.

Sincerely,

Willie L. Brown, Jr.
Mayor

WLB:kz

OF CALIFORNIA — THE RESOURCES AGENCY
PETE WILSON, Governor
ICE OF HISTORIC PRESERVATION
ARTMENT OF PARKS AND RECREATION
DX 942896
ENTO 94296-0001
-6624
(916) 653-9824

8-541-6374
Mark Melandry

August 13, 1997

Reply To: FHWA970801A

Substations on SF side & YBI exactly name a substation on Oakland TO

Bradley Keazer
Acting Division Administrator
California Division
Federal Highway Administration
980 Ninth Street, Suite 400
Sacramento CA 95814-2724

Re: Addendum HASR/FAE and MOA for Proposed Seismic Retrofit of the San Francisco - Oakland Bay Bridge

Dear Mr. Keazer:

In accordance with 36 CFR 800, regulations implementing Section 106 of the National Historic Preservation Act, you have asked for my comments on the following findings made by FHWA for the undertaking cited above:

I. National Register Status of Certain Properties Within the Undertaking's Area of Potential Effects

A. that the Sterling Street Substation, the YBI Electrical Substation, and the Caltrans Garage on YBI are National Register eligible because they are contributors to the National Register eligible Bay Bridge as a whole.

B. that 461 Second Street, 64 Clementina Street, 246 First Street in San Francisco and portions of the San Francisco Sea Wall that are verifiably located within the APE are still National Register eligible.

C. that fragments of the Belt Line Railway within the APE at the waterfront continue to be ineligible owing to integrity loss.

D. that Piers 26 and 28 in San Francisco, together with the two bulkhead buildings flanking Pier 26 are National Register eligible as a district. The reasons for and the areas of significance as well as the configuration of the district boundary and its justification are set forth on page 2 of the district primary record included in the Addendum HASR.

ey Keazer
st 13, 1997
Two

that Pier 24 is not National Register eligible owing to a loss integrity.

that Building 262 of Naval Station Treasure Island is eligible nclusion in the National Register.

I. Effects of the Undertaking on Historic Properties

that the undertaking affects the Bay Bridge, 461 Second treet, San Francisco, Building 262 NSTI and may affect otentially National Register eligible archeological resources and ortions of the San Francisco Sea Wall located within the APE.

3. that the undertaking does not affect Quarters 1 on YBC, 246 irst Street, 64 Clementina Street or the Piers 26/28 historic istrict in San Francisco.

I concur in all of the foregoing determinations made by FHWA with ect to this undertaking.

FHWA has provided for my consideration a Memorandum of Agreement the terms of which specify how the undertaking's effects on historic properties will be taken into account. I have reviewed the agreement and find it to be acceptable as the means for both affording the Advisory Council an opportunity to comment on the undertaking and for taking the undertaking's effects on historic properties into account. I have therefore executed the agreement and it is enclosed for FHWA's execution and transmital to the Council.

FHWA's consideration of historic properties in the planning for this highly prominent and important undertaking is appreciated. If you have any questions, please call Hans Kreutzberg at 653-9107.

Sincerely,

for Cherilyn Widell
State Historic Preservation Officer

losure

TE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

PARTMENT OF TRANSPORTATION
3660
ND, CA 94623-0660
286-4444
(510) 286-4454

August 18, 1997

Ala/SF 80
01200K

Mr. James Bybee
National Marine Fisherics Service
777 Sonoma Avenue, Room 325
San Ramon, CA 95405

Dear Mr. Bybee:

Special Status Species List for Construction of a New Eastern Span - San Francisco-Oakland Bay Bridge

The California Department of Transportation (Caltrans) is requesting a list of endangered, threatened, and candidate species that may be present in the vicinity of the San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Retrofit Project, pursuant to Section 7 of the Endangered Species Act, as amended. Caltrans has previously evaluated the seismic retrofit of the existing structure. Due to the cost associated with that project, the alternative of replacing the existing structure with a new span is also being considered. Alternatives that will be evaluated potentially include different parallel alignments to the north and south, and various structural designs. The new span would be constructed from east of the Toll Plaza in Alameda County to Yerba Buena Island in San Francisco County. The project is located entirely within the USGS Oakland East 7.5 minute quadrangle. Construction will require work within the Bay waters as well as at the bridge abutments and approaches.

If you have any questions regarding this request, please call Mara Melandry at (510) 286-5582. Thank you.

Sincerely,

HARRY Y. YAHATA
District Director

By
Mara Melandry
ROBERT GROSS

for Office Chief
Office of Environmental Planning South

ATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

EPARTMENT OF TRANSPORTATION
660
ND, CA 94623-0660
10) 286-4444
D (510) 286-4454

August 18, 1997

Ala/SF 80
01200K

Mr. Joel Medlin
Field Supervisor
U.S. Fish and Wildlife Service
Sacramento Field Office
3310 El Camino Avenue, Suite 130
Sacramento, CA 95821-6340

Dear Mr. Medlin:

Special Status Species List for Construction of a New Eastern Span - San Francisco-Oakland Bay Bridge

The California Department of Transportation (Caltrans) is requesting a list of endangered, threatened, and candidate species that may be present in the vicinity of the San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Retrofit Project, pursuant to Section 7 of the Endangered Species Act, as amended. Caltrans has previously evaluated the seismic retrofit of the existing structure. Due to the cost associated with that project, the alternative of replacing the existing structure with a new span is also being considered. Alternatives that will be evaluated potentially include different parallel alignments to the north and south, and various structural designs. The new span would be constructed from east of the Toll Plaza in Alameda County to Yerba Buena Island in San Francisco County. The project is located entirely within the USGS Oakland East 7.5 minute quadrangle. Construction will require work within the Bay waters as well as at the bridge abutments and approaches.

If you have any questions regarding this request, please call Mara Melandry at (510) 286-5582. Thank you.

Sincerely,

HARRY Y. YAHATA
District Director

By

ROBERT GROSS
Mara Melandry
for Office Chief
Office of Environmental Planning South

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
777 Sonoma Ave. Rm 325
Santa Rosa, CA 95404

August 26, 1997 F/SW03:DWC

Mr. Harry Yahata
Cal Dept of Transportation
Box 23660
Oakland CA 94623-0660

Dear Mr Yahata:

Thank you for your letter of August 18, 1997 regarding the presence of federally listed (or proposed for listing) threatened or endangered species or critical habitat that may be affected by construction of a new eastern span of the San Francisco - Oakland Bay Bridge .

Available information indicates that the following species may occur in the project area:

Sacramento River winter-run chinook salmon (Oncorhynchus tshawytscha)- endangered
steelhead (Oncorhynchus mykiss) - Central California Coast ESU - threatened
steelhead (Oncorhynchus mykiss) - Central Valley ESU - proposed as endangered

The site is also located within the designated critical habitat for winter-run chinook salmon (58 FR 33212).

In addition, chinook salmon may occur in the project area and NMFS is currently conducting a status review pursuant to the Endangered Species Act for this species throughout its range in California, Oregon, Idaho, and Washington.

The U.S. Fish and Wildlife Service (USFWS) may also have listed species or critical habitat under its jurisdiction in the project area. Please contact Mr. Joel Medlin, Field Supervisor, USFWS, at 3310 El Camino Avenue, Room 130, Sacramento, California 95821, or (916) 979-2710, regarding the presence of listed species or critical habitat under USFWS jurisdiction that may be affected by your project.

If you have questions concerning these comments, please contact Dan Cheng of my staff at (707) 575-6069.

Sincerely,

James R. Byrne
Northern Area
Environmental Coordinator

cc: J. Slawson, NMFS Long Beach

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:
1-1-97-SP-2027

August 29, 1997

Robert Gross, Office Chief
Office of Environmental Planning South
(Attn: Mara Melandry)
Department of Transportation
Box 23660
Oakland, California 94623-0660

Subject: Species Lists for San Francisco-Oakland Bay Bridge East Span Seismic Retrofit Project, San Francisco County, CA

Dear Mr. Gross:

As requested by letter from your agency dated August 18, 1997, you will find enclosed lists of sensitive species that may be present in *or may be affected by* projects in the subject project area (see Enclosure A). These lists fulfill the requirement of the Fish and Wildlife Service (Service) to provide species lists pursuant to section 7(c) of the Endangered Species Act of 1973, as amended (Act).

The animal species on the Enclosure A quad list are those species we believe may occur within, *or be affected by projects within*, the USGS Oakland East Quad, where your project is planned.

Any plants on the Enclosure A quad list are those *that have actually been observed* in the project quad. Plants on the county list may also occur in the quad where your project is planned.

Some of the species listed in Enclosure A may not be affected by the proposed action. A trained biologist or botanist, familiar with the habitat requirements of the listed species, should determine whether these species or habitats suitable for these species may be affected by the proposed action. For plant surveys, the Service recommends using the enclosed Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species (Enclosure C).

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is available upon request. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Enclosure B for a discussion of the responsibilities Federal agencies have under section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

Formal consultation, pursuant to 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. If you determine that a proposed species may be adversely affected, you should consider requesting a conference with our office pursuant to 50 CFR § 402.10. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

Candidate species are currently being reviewed by the Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Endangered Species Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected, you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

In the Federal Register of February 28, 1996, the Service changed its policy on candidate species. The term *candidate* now strictly refers to species for which the Service has on file enough information to propose listing as endangered or threatened. Former *category 2 candidate* species - species for which listing is possibly appropriate but for which the Service lacks sufficient information to support a listing proposal - are now called *species of concern*. They are no longer monitored by the Service. However we have retained them on the enclosed list for general information. We encourage consideration of them in project planning, as they may become candidate species in the future.

If the proposed project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by the U.S. Army Corps of Engineers (Corps), a Corps permit will be required, pursuant to section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act. Impacts to wetland habitats require site specific mitigation and monitoring. You may request a copy of the Service's General Mitigation and Monitoring Guidelines or submit a detailed description of the proposed impacts for specific comments and recommendations. If you have any questions regarding wetlands, contact Mark Littlefield at (916) 979-2113.

Please contact Mr. Michael Thabault at (916) 979-2752 if you have any questions regarding the attached list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of the section 7 office assistant at this address.

Sincerely,

Patrick Leonard

for Wayne S. White
Field Supervisor

Enclosures

ENCLOSURE A

Endangered and Threatened Species that May Occur in or be Affected by Projects in the Area of the Following California County or Counties

August 29, 1997

SAN FRANCISCO COUNTY

Listed Species

Mammals

- salt marsh harvest mouse, *Reithrodontomys raviventris* (E)
- Steller (=northern) sea-lion, *Eumetopias jubatus* (T)

Birds

- American peregrine falcon, *Falco peregrinus anatum* (E)
- California brown pelican, *Pelecanus occidentalis californicus* (E)
- California clapper rail, *Rallus longirostris obsoletus* (E)
- western snowy plover, *Charadrius alexandrinus nivosus* (T)
- bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

- leatherback turtle, *Dermochelys coriacea* (E)
- loggerhead turtle, *Caretta caretta* (T)
- green turtle, *Chelonia mydas (incl. agassizi)* (T)
- olive (=Pacific) ridley sea turtle, *Lepidochelys olivacea* (T)

Amphibians

- California red-legged frog, *Rana aurora draytonii* (T)

Fish

- tidewater goby, *Eucyclogobius newberryi* (E)
- winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)
- winter-run chinook salmon critical habitat, *Oncorhynchus tshawytscha* (E)
- delta smelt, *Hypomesus transpacificus* (T)
- Central California steelhead, *Oncorhynchus mykiss* (T)

Invertebrates

- mission blue butterfly, *Icaricia icarioides missionensis* (E)
- San Bruno elfin butterfly, *Incisalia mossii bayensis* (E)

Plants

- Presidio manzanita, *Arctostaphylos hookeri ssp. ravenii* (E)

SAN FRANCISCO COUNTY

Listed Species

Plants

- Presidio clarkia, *Clarkia franciscana* (E)
- Marin dwarf-flax, *Hesperolinon congestum* (T)
- marsh sandwort, *Arenaria paludicola* (E)
- beach layia, *Layia carnosa* (E)

Proposed Species

Fish

- Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Plants

- San Francisco lessingia, *Lessingia germanorum* (PE)

Candidate Species

Amphibians

- California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

- greater western mastiff-bat, *Eumops perotis californicus* (SC)
- long-eared myotis bat, *Myotis evotis* (SC)
- fringed myotis bat, *Myotis thysanodes* (SC)
- long-legged myotis bat, *Myotis volans* (SC)
- Yuma myotis bat, *Myotis yumanensis* (SC)
- San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)
- Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)
- salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)

Birds

- tricolored blackbird, *Agelaius tricolor* (SC)
- Bell's sage sparrow, *Amphispiza belli belli* (SC)
- ferruginous hawk, *Buteo regalis* (SC)
- little willow flycatcher, *Empidonax traillii brewsteri* (SC)
- saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

SAN FRANCISCO COUNTY

Species of Concern

Birds

- black rail, *Laterallus jamaicensis* (SC)
- Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)

Reptiles

- northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
- southwestern pond turtle, *Clemmys marmorata pallida* (SC)
- California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

- foothill yellow-legged frog, *Rana boylii* (SC)

Fish

- green sturgeon, *Acipenser medirostris* (SC)
- river lamprey, *Lampetra ayresi* (SC)
- Pacific lamprey, *Lampetra tridentata* (SC)
- longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

- Opler's longhorn moth, *Adela oplerella* (SC)
- sandy beach tiger beetle, *Cicindela hirticollis gravida* (SC)
- globose dune beetle, *Coelus globosus* (SC)
- Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)
- bumblebee scarab beetle, *Lichnanthe ursina* (SC)

Plants

- San Francisco Bay spineflower, *Chorizanthe cuspidata var. cuspidata* (SC)
- San Francisco wallflower, *Erysimum franciscanum* (SC)
- fragrant fritillary, *Fritillaria liliacea* (SC)
- San Francisco gumplant, *Grindelia hirsutula var. maritima* (SC)
- Marin checkermallow, *Sidalcea hickmanii ssp. viridis* (SC)
- Mission Delores campion, *Silene verecunda ssp. verecunda* (SC)
- San Francisco owl's-clover, *Triphysaria floribunda* (SC)
- San Francisco manzanita, *Arctostaphylos hookeri ssp. franciscana* (SC)
- alkali milk-vetch, *Astragalus tener var. tener* (SC)
- compact cobweb thistle, *Cirsium occidentale var. compactum* (SC)
- Diablo rock-rose, *Helianthella castanea* (SC)

SAN FRANCISCO COUNTY

Species of Concern

Plants

Kellogg's (wedge-leaved) horkelia, *Horkelia cuneata ssp. sericea* (SC)

San Francisco popcornflower, *Plagiobothrys diffusus* (SC)

adobe sanicle, *Sanicula maritima* (SC)

coast lily, *Lilium maritimum* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(*)	Possibly extinct.	
	Critical Habitat	Area essential to the conservation of a species.

ENCLOSURE A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Following Selected Quads
August 29, 1997

QUAD : 465C OAKLAND EAST

Listed Species

Mammals

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

American peregrine falcon, *Falco peregrinus anatum* (E)

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

bald eagle, *Haliaeetus leucocephalus* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

tidewater goby, *Eucyclogobius newberryi* (E)

Central California steelhead, *Oncorhynchus mykiss* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

Plants

robust spineflower, *Chorizanthe robusta* (E)

Presidio clarkia, *Clarkia franciscana* (E)

Proposed Species

Reptiles

Alameda whipsnake, *Masticophis lateralis euryxanthus* (PE)

Fish

Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Invertebrates

callippe silverspot butterfly, *Speyeria callippe callippe* (PE)

Plants

pallid manzanita (Alameda manzanita), *Arctostaphylos pallida* (PE)

QUAD : 465C OAKLAND EAST

Candidate Species

Mammals

San Joaquin Valley woodrat, *Neotoma fuscipes riparia* (C)

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)

Alameda Island mole, *Scapanus latimanus parvus* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (SC)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

black rail, *Laterallus jamaicensis* (SC)

Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

QUAD : 46SC OAKLAND EAST

Species of Concern

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

western spadefoot toad, *Scaphiopus hammondii* (SC)

Invertebrates

Ricksecker's water scavenger beetle, *Hydrochara ricksecker*i (SC)

San Francisco lacewing, *Nothochrysa californica* (SC)

Plants

alkali milk-vetch, *Astragalus tener var. tener* (SC)

fragrant fritillary, *Fritillaria liliacea* (SC)

Diablo rock-rose, *Helianthella castanea* (SC)

Kellogg's (wedge-leaved) horkelia, *Horkelia cuneata ssp. sericea* (SC)

most beautiful (uncommon) jewelflower, *Streptanthus albidus ssp. peramoenus* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(*)		Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

Enclosure B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: (1) federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; (2) Consultation with FWS when a federal action may affect a listed endangered or threatened species to insure that any action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the federal agency after determining the action may affect a listed species; and (3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment-Major Construction Activity[1]

Requires federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat is present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirement; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, and problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

---

[1] A construction project (or other undertaking having similar physical impacts) which is a major federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

[2] "Effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

Enclosure C

Guidelines For Conducting And Reporting Botanical Inventories
For Federally Listed, Proposed And Candidate Plants

(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations(s) is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

   a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

   b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

   c. survey dates and survey methodology(ies)

   d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

   e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

   f. current and historic land uses of the habitat(s) and degree of site alteration

   g. presence of target species off-site on adjacent parcels, if known

   h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include:

a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project

b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than 3 years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

c:JVLS, HYY, KJT, SH, BHM, MM, SHEMINGER

From: Denis Mulligan

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

TREASURE ISLAND PROJECT
410 PALM AVENUE
BUILDING 1, ROOM 237
TREASURE ISLAND
SAN FRANCISCO, CA 94130
(415) 274-0660
FAX (415) 274-0299

LARRY FLORIN, DIRECTOR
WENDY LINKA, DIRECTOR OF MARKETING
CHRISTINE TEJADA, DIRECTOR OF DEVELOPMENT

September 5, 1997

Honorable Pete Wilson
Governor, State of California
State Capital
Sacramento, CA 95814

Dear Governor Wilson:

I am writing to urge your signature on AB-699, the bill that would create the Treasure Island Development Authority. The creation of this Authority will allow us to consolidate a duplicate and redundant decision-making process into one entity. Eliminating this redundancy will allow us to expedite the reuse of Treasure Island, a project that will benefit all Californians. I have spoken with Jim Van Loben Sels regarding his concerns about access to the existing and proposed new eastern span of the San Francisco-Oakland Bay Bridge. I am enclosing a letter that I have sent to Mr. Van Loben Sels that addresses his concerns.

Thank you in advance.

Sincerely,

Willie L. Brown Jr.
Mayor

enclosure

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

TREASURE ISLAND PROJECT
410 PALM AVENUE
BUILDING 1, ROOM 237
TREASURE ISLAND
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(415) 274-0660
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LARRY FLORIN, DIRECTOR
WENDY LINKA, DIRECTOR OF MARKETING
CHRISTINE TEJADA, DIRECTOR OF DEVELOPMENT

September 5, 1997

James W. van Loben Sels
Director
California Department of Transportation
1120 "N" Street
Sacramento, CA 95814

Dear Jim:

Based on our recent conversation, I understand that Caltrans is concerned about access to the eastern span of the Bay Bridge. As you know, the City, acting as the Local Reuse Authority for Treasure Island, is beginning its negotiations with the Navy over the conveyance of Treasure and Yerba Buena Islands to the City from the Navy. If we should be successful in these negotiations, we are prepared to make the following offer to Caltrans to help facilitate uninterrupted access:

1. The City shall grant, without cost, an easement for the use, operation, maintenance, repair, construction, reconstruction, and retrofit of the existing San Francisco-Oakland Bay Bridge and associated transportation facilities under, over, and across Yerba Buena Island. This easement shall extend 39 meters northwesterly and 39 meters southwesterly from each edge of the existing San Francisco-Oakland Bay Bridge and Tunnel structures. Furthermore, we will agree that no non-transportation uses will be allowed within that easement area without written approval of Caltrans, on the condition that Caltrans will not unreasonably withhold its approval for such projects.

2. The City shall execute a similar agreement for the proposed San Francisco-Oakland Bay Bridge and Tunnel new eastern span at the appropriate time.

3. The City will also grant Caltrans appropriate easements for ingress and egress across existing and future roads on Yerba Buena Island.

Larry Florin of my staff is prepared to work out the details of this agreement.

I look forward to continuing to work together on this important project.

Sincerely,

Willie L. Brown Jr.
Mayor

cc: Governor Pete Wilson

OFFICE OF THE MAYOR
SAN FRANCISCO

TREASURE ISLAND PROJECT
410 PALM AVENUE
BUILDING 1, ROOM 237
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WILLIE LEWIS BROWN, JR.

LARRY FLORIN, DIRECTOR
WENDY LINKA, DIRECTOR OF MARKETING
CHRISTINE TEJADA, DIRECTOR OF DEVELOPMENT

RECEIVED
DEC 1 1997
B. QUAN

EXECUTIVE OFFICE

Harry Yahata
Regional Director
California Department of Transportation
Box 23660
Oakland, Ca. 94623-0660

Dear Harry,

I am writing to express my concern regarding the environmental impact report being prepared for the East span of the Bay Bridge replacement project. I understand that the EIR does not currently include a discussion of a proposed improvement for the TI/YBI ramps. I urge you to amend the project scope to include this alternative in your project.

As you know the existing ramp system is substandard having been designed for traffic and speeds of the 1930's. It is important to have the ramps brought up to current standards in order to make reuse of Treasure Island feasible. As you know we are actively pursuing funding alternatives that will allow this to be included in the reconstruction project.

We understand that the reason that you are not including the ramp reconstruction in the EIR is that the ramp project is not currently funded. It is my understanding that you are including an alternative that would include a bicycle lane on the new East span a project that is not currently funded. I would urge you to apply the same standard to the proposed access ramp improvement project. As you are aware including the proposal in the EIR at this stage will certainly help to expedite the overall project once we are successful in securing funding.

My staff would be happy to work with you to provide whatever information your staff may need to have this included in the EIR.

Thank you for your consideration of this request.

Sincerely,

Willie L. Brown Jr.
Mayor

DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-5006

IN REPLY REFER TO:

5090.1B
Ser 7031PD/EP-1395
November 21, 1997

Mr. Alex Ramirez
520 South Van Ness Ave.
San Francisco, California 94110

Dear: Mr. Ramirez:

The Navy is preparing to issue a permit to Caltrans for archeological investigations on Yerba Buena Island pursuant to the *Archaeological Resources Protection Act* and implementing regulations *43 CFR Part 7*. Yerba Buena Island is part of the former Naval Station, Treasure Island. A recorded archeological site, CA-SFr-4, is located underneath the Oakland Bay Bridge. The site has been highly disturbed, first by construction of the Naval Training Station in ~~the~~ 1898 and again, in 1934, by construction of the Oakland-Bay Bridge.

Caltrans is gathering information for preparation of a Draft Environmental Impact Statement in conjunction with planning for the East Span Seismic Safety project on the San Francisco-Oakland Bay Bridge. Accordingly, the Navy is requesting any information you might have regarding places that may be important to Native Americans within the project area (see attached ~~Map 1~~) for consideration in project planning.

Caltrans is planning a subsurface archeological test of CA-SFr-4 to determine the presence or absence of archeological materials within the project area. The fieldwork should take place in late 1997 or early 1998. Any concerns or information you may have regarding this location will be especially important and greatly appreciated. Caltrans will make arrangements to provide for a Native American monitor during the excavation, which is anticipated to take 3 or 4 days.

Subj: CALTRANS TEST OF SITE ON YERBA BUENA ISLAND

This request has been prepared in compliance with the *National Historic Preservation Act* and with the *Archaeological Resources Protection Act*. Because there are no federally recognized tribes associated with this site, the *Native American Graves Protection and Repatriation Act* does not apply. Should any human remains be found during the proposed archeological testing, Caltrans will follow *California Public Resources Code 5097* and the Native American Heritage Commission will designate a Most Likely Descendant to make recommendations regarding burial treatment. If you have any questions or wish to respond, please call Patricia Duff at (650) 244-3019 or write to her at the letterhead address.

Sincerely,

Louis S. Wall
Cultural Resources Program Manager
Environmental Planning Branch

Attachment

Copy to:
Larry Meyers, Native American Heritage Commission
Mara Melandry, Caltrans District 4
Danielle Huey, SOUTHWEST NAVFACENGCOM

MODE = MEMORY TRANSMISSION START=OCT-22 16:07 END=OCT-22 16:09

FILE NO.= 195

NO.	COM	ABBR/NTWK	STATION NAME/ TELEPHONE NO.	PAGES	FRG.NO.	PROGRAM NAME
001	OK	E	914152443285	001/001		

-ENV. PLNG. SOUTH D4 -

********** -ENV. PLNG. SOUTH- ***** - 510 286 6374- *********

NATIVE AMERICAN CONTACTS

San Francisco County
October 22, 1997

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Ohlone/Costanoan

Indian Canyon Mutsun Band of Costanoan
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Ohlone/Costanoan

Jakki Kehl
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Ohlone/Costanoan

Muwekma Indian Tribe
Rosemary Cambra, Chairperson
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Chumash
Salinan

The Ohlone Indian Tribe
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(408) 394-5915
Ohlone/Costanoan

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To MARA MELANDEZ	From D. TREADWAY
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Dept. CALTRANS	Phone # 916 653-4038
Fax # 510 286-6374	Fax #

Patrick Orozco
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Ohlone/Costanoan

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To PAT DUFF	From MARA
Co. NAVY	Co.
Dept.	Phone #
Fax # 415-244-3206	Fax #

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code.

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October 7, 1997

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his list is current only as of the date of this document.

tribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, ction 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regards to the cultural assement for Yerba Buena Island, Alameda County.

STATE OF CALIFORNIA—BUSINESS, TRANSPORTA... AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION

...X 23660
...KLAND, CA 94623-0660
(510) 286-4444
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December 17, 1997

The Honorable Willie Brown, Jr.
Treasure Island Project
410 Palm Avenue
Building 1, Room 237
Treasure Island
San Francisco, CA 94130

Dear Mayor Brown:

Thank you for your letter regarding the ramps of Yerba Buena Island. We received your letter on November 26, 1997.

We agree that ramps on the Island are important element to the success of the Treasure Island Reuse plan and that the ramps are substandard. As you are aware, the replacement of the ramps is not currently funded. Caltrans looks forward to working with you and the Metropolitan Transportation Commission (MTC) to secure funding for the ramps. When funding is secured, a separate environmental document can be prepared. If the funding issue is resolved shortly, the new ramps and the seismic safety project on the East Span could be constructed at the same time. Caltrans agrees that it is desirable to construct both projects at the same time.

Replacement of the ramps is not related to the purpose and need of the East Span Seismic Safety Project. Furthermore, the ramps are outside our jurisdiction since they are owned by the Navy. To include replacement of the ramps in the East Span Seismic Safety Project environmental document would be to expand the scope beyond the intent of seismic safety. Caltrans, accordingly, cannot amend the project scope to include ramp reconstruction in the East Span Seismic Safety Project. At the same time, it appears that with any of the replacement alternatives for the East Span project, the eastbound on-ramp must be demolished and replaced; this on-ramp conflicts with all the replacement alternatives. Accordingly, this will be addressed as part of the East Span Seismic Safety Project.

We would like to clarify the status of the pedestrian/bicycle path on the east span. It is not an alternative to be evaluated in the Environmental Impact Statement (EIS); it is rather a design variation for each replacement alternative. Further, while such a facility is not yet funded, legislation has been passed which will allow MTC to decide whether to continue the $1.00 toll surcharge for an additional two years to fund amenities such as a path. A funding mechanism is therefore in place for the pedestrian/bicycle path, should MTC decide to fund it. Should MTC decide not to fund the pedestrian/bicycle path, the seismic safety project can continue to move forward with the design variations that do not include it. This is very important because federal law prohibits approval of a project that is not fully funded.

Caltrans looks forward to working with San Francisco and the Metropolitan Transportation Commission in securing the necessary funding for this important transportation improvement. Please contact me at (510) 286-5900 to discuss this matter further.

Sincerely,

for HARRY Y. YAHATA
District Director

c: Larry Dahms (Metropolitan Transportation Commission)
Kenn Parsons (Department of the Navy)
Hilary Gitelman (City and County of San Francisco, Planning Department)

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Ala/SF 80.
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CITY OF OAKLAND

CITY HALL • ONE CITY HALL PLAZA • OAKLAND, CALIFORNIA 94612

Landmarks Preservation
Advisory Board

TTY 839-6451

January 14, 1998

Mr. Harry Y. Yahata, District Director
State of California Department of Transportation
P.O. Box 23660
Oakland, CA 94623-0660

Dear Mr. Yahata:

This is in response to your request for comments under the Federal Section 106 process on the proposed seismic improvement project at the San Francisco-Oakland Bay Bridge, a civil engineering landmark that is eligible for listing on the National Register of Historic Places.

In July, 1997 CalTrans environmental planner Mara Malandry made a presentation to the Oakland Landmarks Preservation Advisory Board and showed the CD-ROM that introduces the option of an entirely new East Bay Span between Oakland and Yerba Buena Island. The Board discussed preservation issues associated with removal of the historic East Bay Span, and heard speakers. The Board's discussion continued at the September 13, 1997 Landmarks Board meeting. Our concerns and recommendations are outlined below. It is our understanding that participation in this manner will not limit or preclude further comment in the design or environmental review process. We expect that at such time as the significance of the Bay Bridge East Bay span is fully documented, additional mitigation measures will merit discussion and consideration.

1. **Examine retrofit of the existing, historic East Bay span as an option.**

   Retrofit is generally the most preservation-sensitive approach for the continued use of older structures determined to fall short of modern standards. Has the case been made that retrofit of the East Bay span is not a feasible alternative? From news reports it appears to be the least expensive option in terms of construction costs. (Do the costs represented for a new East Bay span include modification of access during construction, traffic delays and disruption, energy costs, impacts on landfill from demolition debris, etc.?) Retrofit should be examined as an alternative to replacement, including the impact, if any, of the retrofit design on the appearance of the East Bay span.

2. Examine a combination of demolition and retrofit to retain the most significant part of the East Bay span.

Another preservation-sensitive alternative would be to keep and retrofit the original cantilevered section of the East Bay span--which is where the engineering significance resides--but build a new improved viaduct leading up to it.

3. Mitigation to demolition

If demolition and replacement are chosen, the history and significance of the East Bay span of the Bay Bridge suggest certain areas for mitigation:

a. Engineering accomplishments: largest cantilever in United States; deepest pier support in the world.
- Consult engineering professionals to see whether any useful information might be derived from stress tests (or the like) prior to demolition, from analysis of how well the bridge and its parts have held up over sixty years of use, and from professional observation of the demolition process. Undertake the engineers' recommendations, and record the results in a manner accessible to professionals and the interested public.
- Prepare a professional monograph on the engineering methods applied in the design and construction of the Bay Bridge, with an emphasis on unique achievements or approaches.
- Construct a model of the Bay Bridge to illustrate engineering considerations (depth of San Francisco Bay, etc.) and design solutions. (See #3f below.) The lightness of the structure, and the grace of the pylons as seen from the water, are among the characteristics that should be conveyed.
- Document the experience of driving across the cantilever section in various types of motor vehicles, and of travelling underneath it in various types of boat.

b. Hoover-Young Commission policy "Not only will it be the largest bridge in the world...but it also must be the most beautiful..."
-This founding philosophy should pertain equally to the replacement structure. The sheer size of the bridge will make it a visual marker for the region; it should be pleasing in appearance, a memorable experience for visitors, and an asset to daily life for residents.
-The character of the Bay Bridge is important in the

context of San Francisco Bay as a whole. Each of the four bridges on the bay has its own distinct character. Of the three proposals for replacement of the East Span, one strongly resembles the San Mateo Bridge. To pursue that design would deny Oakland the positive identity a bridge can confer, and would deprive the Bay Area of its distinguished collection of four differentiated bridge structures. A rule-of-thumb the Landmarks Board often uses is that to justify demolition, the proposed replacement should be at least as good as the historic structure.

-The replacement design should include a gateway feature on the Oakland side to signal and celebrate arrival in Oakland. The existing two-level bridge has long deprived Oakland of the drama of an upper-level entrance; a new bridge at last affords Oakland equal consideration, but the proposals thus far position the "landmark" feature next to Yerba Buena Island instead of the East Bay. In the west bound direction, the gateway would celebrate at the Oakland terminus the threshold at which one leaves land and begins to cross San Francisco Bay. Landscape elements could also be part of a gateway feature.

-(Although the history says the Hoover Commission policy was developed to protect the views of San Francisco, arguably the change in the relative importance of San Francisco and Alameda/Contra Costa counties would dictate that the East Span should now also be of very high design quality.)

-To preserve the quality of personal connection and association between Bay Area residents and this important landmark, commission from a well-regarded artist a large scale painting (in the tradition of California landscape painting) that portrays the East Span of the Bay Bridge in the context of the Oakland shoreline in the year 2000, for display at a prominent, publicly accessible location.

c. <u>Design criteria.</u> The design requirements which drove the original Bay Bridge design should be acknowledged in the new design; a deep channel was needed on the Oakland side, hence the cantilever solution. Isn't the shipping channel still necessary? The viaduct proposal does not appear to express the importance of shipping to Oakland, or to take ship traffic into consideration. The new East Span design should have some visual relation to the historic cantilever and to contemporary Oakland as a major Pacific port. The bridge design must accommodate and facilitate ship traffic to and from the Port of Oakland.

d. Human aspect of the bridge construction. Compile the story of the construction of the Bay Bridge. The history suggests that in addition to the stories of the steel workers, those of the engineers who helped to build the bridge are worth documenting.

e. Role of the bridge in regional development and importance of the eastern channel to the regional economy. This is a large enough topic to support a documentary video, oral history, etc. covering population shifts, land use changes, transportation history, the two ports, international commerce, and other socio-economic aspects.

f. Create a permanent interpretive center. Combine the above historical aspects (as well as material developed for Bay Bridge 50th Anniversary) into interpretive programs for the public, school curriculum, etc. Create a permanent study center to house histories, videos, artifacts, a scale model of the Bay Bridge (like the Bay Model), Peter Stackpole photographs, paintings and drawings, computer simulations, etc. Include an exhibit which compares the design of the original Bay Bridge and the replacement, and, equally important, compares the design process then and now.

A building in downtown Oakland, constructed in the same period as the Bay Bridge, could be devoted to such an interpretive center about the Bay Bridge and associated transportation themes. This would preserve and expand understanding and appreciation of the Bay Bridge, would create a visitors' destination in Oakland, and return a historic building to permanent active use.

- In association with Bay Area newspapers, issue a Souvenir Edition upon the re-opening of the East Bay Span, in the manner of the November 12, 1936 San Francisco Examiner "Bridge Souvenir Edition." Include a replica of the 1936 souvenir edition, along with historic narrative and illustrations.

4. Historic rail component.

To preserve the historic rail aspect, include light rail on the bridge or design it to support conversion to light rail in the future.

5. Reuse of materials

- Salvage instructive artifacts for display at the interpretive center, or other educational facilities.

-Reuse components of the East Span for other purposes. Maintain a roster of locations where parts of the bridge have been recycled for other uses, or in other forms.
- Consider using components of the original bridge to create a large public art project located at the Oakland terminus, such as the gateway feature to Oakland and the East Bay discussed above.

In conclusion, the HABS/HAER documentation, and the more complete history prepared during environmental review, may well suggest additional mitigation measures to perpetuate the cultural, architectural and technical significance of the Bay Bridge.

Thank you very much for the opportunity to comment on this extremely important project. We look forward to reviewing the documentation which elaborates on the full significance of the East Bay span.

Please continue to keep us informed by way of the Secretary to the Landmarks Preservation Advisory Board, Helaine Kaplan Prentice, at Community & Economic Development Agency, 1330 Broadway, 2nd Floor, Oakland, CA 94612, phone (510) 238-2978.

Sincerely yours,

Andrew Carpentier HKP

ANDREW CARPENTIER, Chair

cc: Robert Gross, District Office Chief
✓Mara Malandry, Office of Environmental Planning, South
Landmarks Preservation Advisory Board members: Annalee Allen, Janet Benson, Andrew Carpentier, Carolyn Douthat, Rene Dymond, Norman Hooks, George I. Lythcott
Marina Carlson, Office of Mayor Elihu Harris
Chris Pattillo, Pattillo & Garrett Landscape Architects
Jeff Eichenfeld, California Preservation Foundation
Oakland Heritage Alliance
Andrew Altmam, CEDA, Chief of Planning
Charles Bryant, CEDA, Zoning Division
Willie Yee, CEDA, Zoning Division
Terry Roberts, Director, PWA

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STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
KLAND, CA 94623-0660
.0) 286-4444
TDD (510) 286-4454

February 4, 1998

Mr. William T. Hogarth, Ph.D.
Acting Regional Administrator
National Marine Fisheries Services
Southwest Region
501 West Ocean Blvd., Suite 4200
Long Beach, CA 90802-4213

Ala/SF 80
02100K

Dear Dr. Hogarth:

By this letter, we request concurrence that our proposed drilling work in San Francisco Bay will have no adverse effect to the endangered winter run Chinook salmon, the threatened west coast steelhead trout and the proposed threatened central valley steelhead trout. The drilling is necessary to assess bedrock and soil conditions for the East Span Seismic Safety Project. The drilling will consist of 12 borings in the Bay, and will be located north of the existing bridge. The drill equipment will be transported on two barges. The drill hole will be advanced inside a 24" diameter drill casing; the drill tools are inside the casing. All drilling fluids will be recirculated and collected on the barge. The drill fluids and cuttings will be tested and disposed of appropriately at designated disposal sites. No significant increase in turbidity due to barge drilling operations is anticipated.

This request is being made under the informal consultation provision of section 7 of the Endangered Species Act of 1973, as amended. The Federal Highway Administration has delegated Caltrans as their non-federal representative for section 7 consultations. We appreciate your assistance in this matter.

If you have any questions or need additional information, please call Sid Shadle, 510-286-6220.

Sincerely,

HARRY Y. YAHATA
District Director

By Marie Melendry
for DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

cc: Chris Mobley (National Marine Fisheries
John Schultz (FHWA)

bc: MMelandry/MMortenson, SHulsebus/PC
Sid Shadle Mike Davis (Parsons)

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
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February 11, 1998

Andrew Carpentier, Chair
Landmarks Preservation Advisory Board
One City Hall Plaza
Oakland, California 94612

Dear Mr. Carpentier:

Thank you for your letter of January 14 concerning the proposed seismic improvement of the East Bay spans of the San Francisco – Oakland Bay Bridge. Your suggestions for measures to mitigate adverse effects of the possible demolition of the existing East Bay spans were helpful, and we appreciate your time and thoughtfulness in developing them. If a replacement alternative is chosen for this project, we will carefully consider all of your suggested mitigation measures and will discuss them with you and the State Historic Preservation Officer (SHPO) as part of our compliance with the National Historic Preservation Act.

In addition, we have the following responses to your comments on the design of a new bridge:

- **Consider retrofit of the existing East Bay span as an option**

Although the Governor and the Metropolitan Transportation Commission's Bay Bridge Task Force have recommended that the bridge be replaced, retrofit of the existing structure will be studied as an alternative through the Environmental Impact Statement (EIS) process. When the cost of a retrofit is 50% or more of the cost of new construction, it is Caltrans' policy to consider reconstruction. You may be interested in the following quote from a summary statement of an economic analysis comparing the costs of a retrofit versus a new bridge:

> "The construction costs of a new bridge will be about $25 million more than that of the retrofit option. However, considering the life-cycle cost of the bridge including maintenance costs, deck rehabilitation costs, probable earthquake damage repairs, and the salvage value of the existing bridge, the new bridge will cost some $281 million less than retrofitting the existing bridge. When user costs are also incorporated into the total cost of the new bridge (including the cost of safety risks associated with the existing bridge while the new bridge is being built), as noted above, the new bridge alternative would cost $625 million less than the retrofit option."

In addition to the economic advantages of a new bridge, there are seismic advantages as well. A retrofitted existing bridge would not perform as well as a new bridge in the event of a severe earthquake.

- **Consider a combination of demolition and retrofit to retain the cantilever portion of the East Bay span.**

The cantilever section of the East Bay span could be retrofitted at a comparable initial construction cost to constructing either the cable-stayed or suspension designs. However, the retrofit would provide a low level of serviceability in the event of a major earthquake. It would not collapse, but would likely sustain major damage, require closure to traffic and would then need to be replaced. This would have a profound impact on the Bay Area economy. A new bridge would remain fully serviceable after a maximum credible earthquake. The life span of a retrofitted cantilever section would be 50 years, compared to a 100 to 150 year life span for a new bridge. In addition, constructing a new viaduct from the Oakland shore to the existing cantilever section and on Yerba Buena Island would require that the bridge be shut down for a minimum of six months.

- **Aesthetics of a replacement bridge**

The Bay Bridge Engineering and Design Advisory Panel (EDAP), which advised the MTC Bay Bridge Task Force, recommended that a new bridge be visually memorable and convey a sense of gateway to Oakland and that views from the bridge in the eastbound direction should consider Oakland's central business district and waterfront. The Bay Conservation and Development Commission's (BCDC) Design Review Board also supports the "gateway" concept. A permit from BCDC will be required for a new bridge. One of the design recommendations approved by MTC was that a new east span should not be double-decked, but rather have a single deck or parallel separated decks. This would provide eastbound traffic with significantly improved views of Oakland and the East Bay.

Six alternatives are being studied for the Draft Environmental Impact Statement, prior to selection of a final design: the no-build alternative, retrofit of the existing structure, and a new structure on four possible alignments (two north of the existing bridge and two south of the existing bridge). The new bridge alternatives have three design variations, including a skyway design and two "signature" designs – a single-tower, cable-stayed design and a single-tower, self-anchored suspension design. Once the 30% design studies are completed this spring for the cable-stayed and suspension designs, the true costs of both "signature" bridges will be known and MTC will make a design recommendation to Caltrans. MTC has the authority for funding such an amenity by extending the $1.00 toll increase for an additional two years beyond the current eight years. You may wish to express your view on this issue to MTC.

- **Preserve the East Bay Shipping Channel**

A new bridge would provide for continued shipping access to and from the Port of Oakland on the east side of Yerba Buena Island. This was recommended by the EDAP and will be required by the United States Coast Guard as a condition of the permit they would issue for a new bridge. Retrofit of the existing bridge would require new piers under the cantilever section, which would reduce the width of the shipping channel. For all project alternatives, the shipping channel will be maintained with a minimum width of 153 meters (500 feet) and a vertical clearance of 42 meters (138 feet).

- **Allow for future light rail transit on a new bridge**

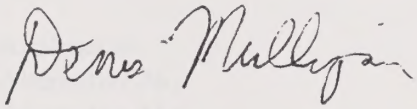
A new bridge will be designed to allow for the loads of possible future rail service, as recommended by MTC. Introduction of light rail transit on a new bridge would be a future decision, consistent with Regional Transportation Planning, and would require public and legislative support.

We appreciate your comments on this important project, and we will keep the Oakland Landmarks Preservation Advisory Board informed as the Section 106 compliance process continues. If you have any additional comments or questions regarding the Section 106 process or mitigation measures, please contact Jared Goldfine, District Branch Chief for San Francisco and Architectural History Studies, Office of Environmental Planning, South (510-286-6203). For questions about the environmental process, please contact Mara Melandry, Environmental Manager for the SFOBB (510-286-5582).

Sincerely,

HARRY Y. YAHATA
District Director

By



DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

cc: Marina Carlson, Office of Mayor Elihu Harris
Jeff Eichenfeld, California Preservation Foundation
Oakland Heritage Alliance
Andrew Altman, CEDA, Chief of Planning
Charles Bryant , CEDA, Zoning Division
Willie Yee, CEDA, Zoning Division
Terry Roberts, Director, PWA
John Schultz, FHWA
Cherilyn Widell, SHPO

'ATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

)EPARTMENT OF TRANSPORTATION
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February 12, 1998

Ms. Hillary E. Gitelman
Environmental Review Officer
City and County of San Francisco
Planning Department
1660 Mission Street, 5th Floor
San Francisco, CA 94103

Dear Ms. Gitelman:

This is in response to your January 10, 1998 notice regarding establishment of baseline conditions for the disposal and reuse of Naval Station Treasure Island. Caltrans and the Federal Highway Administration (FHWA) are preparing an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project (East Span Seismic Safety Project). A Notice of Intent to prepare the EIS was published in the Federal Register on April 21, 1997.

We request that the baseline conditions established for the Treasure Island Reuse Joint EIR/EIS include the East Span Seismic Safety Project. As you are aware from our coordination meetings which began on October 28, 1997, the East Span Seismic Safety Project EIS will evaluate six alternatives, including:

- No-Build
- Retrofit Existing East Span Structure
- Replacement Alignment Alternative N-1
- Replacement Alignment Alternative N-2
- Replacement Alignment Alternative S-1
- Replacement Alignment Alternative S-2

Caltrans has provided your agency with the conceptual plans for the replacement alternatives.

Caltrans and the FHWA are currently consulting with federal agencies under the NEPA/Section 404 Integration Memorandum of Understanding concerning the range of alternatives to be analyzed in the EIS. Additional alignment alternatives could be identified for review based on this ongoing consultation and in-progress environmental and engineering technical studies.

East Span Seismic Safety Project alternatives, particularly replacement alignment alternatives, may affect redevelopment scenarios on Yerba Buena Island (YBI). Also, as referenced in correspondence from District Director Harry Yahata to Mayor Willie Brown dated December 17, 1997, the East Span Seismic Safety Project EIS will not include the Navy-owned ramps on YBI that are not demolished by East Span Seismic Safety Project alternatives. When funding is secured for the replacement of those ramps which are not affected by the East Span Seismic Safety Project, the replacement project would be the subject of a separate environmental document.

Caltrans will continue to coordinate with the City and County of San Francisco concerning the environmental review of East Span Seismic Safety Project alternatives. We request your inclusion of potential bridge retrofit and replacement alternatives in your EIS/EIR baseline conditions assessment to ensure ongoing coordination of the base reuse and bridge seismic safety projects.

If you have questions concerning this request, please contact Mara Melandry, Environmental Manager, at 510/286-5582.

Sincerely,

HARRY Y. YAHATA
District Director

By

Mara Melandry

for DENIS J. MULLIGAN
District Division Chief
Toll Bridge Program

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

May 13, 1998

The Honorable Mary V. King
Chair, MTC Bay Bridge Design Task Force
101 Eighth Street
Oakland, CA 94607-4700

Dear Supervisor King,

I am writing at this time in regard to your pending decision on funding of Bay Bridge project elements, and specifically, to clarify San Francisco's position and intentions with respect to a very important element, the Transbay Transit Terminal replacement.

As you may recall, in late 1997, San Francisco's on-going environmental work on a replacement terminal and the future of land use and development in the Transbay area were suspended due to my concerns about the level of support for the proposed new terminal. Although formally endorsed by the San Francisco Board of Supervisors, the lack of clear support on the part of Caltrans and MTC for San Francisco's work on this important regional transportation project led me to question the value of our endeavor.

Recently, both MTC and Caltrans officials have assured me that they support San Francisco's policy to replace the oversized, unfriendly, and unsound Transbay Transit Terminal with a modern, efficient facility which will welcome increasing numbers of riders for decades to come. Given that assurance, San Francisco has decided to move forward once again with this project and will reinitiate the planning and environmental efforts to build a new terminal at the selected site of Howard and Main and Beale Streets. We will continue to work closely with all responsible agencies and parties to bring this important project to fruition.

Solid land use and transportation planning considerations led San Francisco, working for more than a year through an inter-agency effort, to site the new terminal at the selected location. One of the most important of these considerations is the ability to minimize the impact of building a new terminal on AC Transit's daily operations. Construction of a new terminal at the Howard Street site, coupled with Caltrans' plans to modify the existing terminal for interim operations, will mean that AC Transit's operations will continue to provide quality service to and from San Francisco with little or no operational difficulties. When the new terminal is completed and is linked to the new Terminal Separator Replacement and Bay Bridge via exclusive bus lanes, AC Transit will be able to relocate its operations from the dreary environment of the existing terminal to a bright and hospitable new terminal.

401 VAN NESS AVENUE, ROOM 336, SAN FRANCISCO, CALIFORNIA 94102
(415) 554-6141

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

As you know, the Transbay Transit Terminal replacement is on the list of Bay Bridge project elements to be funded with surplus toll revenue. San Francisco needs the assistance and support of your Task Force to assure that a substantial commitment of funds for a new terminal are provided. The City, working closely with AC Transit, MTC, Caltrans, and other regional transit providers, will now continue to move forward to develop a financing plan, appropriate environmental documentation, and an operating proposal for the new terminal.

With your help, I am confident that we can replace the Transbay Transit Terminal with a new facility which the region will point to with pride. Those who ride transit across the Bay, and to and from other regional locations, certainly deserve a better terminal. I am prepared to work with you and other East Bay leaders to make a new terminal a reality. Thank you for your regional leadership on the critical Bay Bridge needs and for your consideration of San Francisco's views regarding the Transbay Transit Terminal element.

Sincerely,

Willie L. Brown, Jr.
Mayor

401 VAN NESS AVENUE, ROOM 336, SAN FRANCISCO, CALIFORNIA 94102
(415) 554-6141

DREYNOLDS, CSTREETER, TMcDONNELL, JMcCRANK

From: Denis J. Mulligan

Congress of the United States

Washington, DC 20515

June 11, 1998

Jim Spering
Chairman
Metropolitan Transportation Commission
Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700

Dear Mr. Spering,

We are writing to encourage the Metropolitan Transportation Commission to follow the recommendation of its architectural advisory panel to incorporate bicycle-access lanes into designs of the replacement east span of the Bay Bridge during its meeting this month. We believe it will be a progressive decision that will benefit generations of Bay Area residents.

Bicycle lanes on the new east span will be the first step toward linking the East Bay and San Francisco by popular alternative transportation, while providing an exciting new recreation for visitors and weekend travelers. In a recent informal San Francisco Chronicle poll, respondents voted at a seven to one margin in support of bicycle and pedestrian access to the bridge. The Golden Gate Bridge is already a popular conduit for bicyclists, who often number more than 3,000 on weekends. The East Shore bicycle path from Albany to the Bay Bridge is currently under construction. The eventual possibility of biking from Oakland into The City will take some drivers off of our congested freeways, encourage the development of recreational open space on Treasure Island, and afford the public views of the entire region from the middle of the Bay that are not possible by car today.

While the west span and approach of the Bay Bridge are being retrofitted without bicycle lanes, bikes on the east span encourage that option — a decision MTC alone can make. While Mayor Willie Brown has discouraged public access to Yerba Buena and Treasure islands, bicycle lanes on the bridge will encourage The City's redevelopment authority to preserve open spaces and make them available to the public.

Bicycles on the new bridge will constitute one enormous step toward connecting the Bay Area as never before. The advisory panel voted 13 to 1 for a bicycle and pedestrian lane. We earnestly hope you will choose their counsel as you meet this month.

Sincerely,

GEORGE MILLER, M.C. NANCY PELOSI, M.C. ANNA ESHOO, M.C.

BARBARA LEE, M.C.

TOM LANTOS, M.C.

LYNN WOOLSEY, M.C.

PETE STARK, M.C.

ELLEN TAUSCHER, M.C.

TOM CAMPBELL, M.C.

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
P.O. BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

June 12, 1998

Mr. Steve McAdam
Bay Conservation and Development Commission
30 Van Ness Avenue, Room 2011
San Francisco, California 94102

Ala/SF 80
EA 012000
East Span Seismic
Safety Project

Dear Mr. McAdam,

Thank you for participating in our meeting on June 2, 1998 regarding the co-ordination of the potential development of a park in the vicinity of the east approach to the San Francisco Oakland Bay Bridge. We appreciate your ideas and contributions to making the area a future recreational and visual resource for Bay Area residents.

We noted the opinions you expressed regarding the need for construction of good roadway access to such a park and that roadway access to such a park would be considered a public access improvement by BCDC staff. We certainly concur.

If you have any questions, please call Mara Melandry, Environmental Manager for the San Francisco-Oakland Bay Bridge at 510-286-5582.

Sincerely,

HARRY Y. YAHATA
DISTRICT DIRECTOR

By Denis Mulligan

DENIS J. MULLIGAN
DISTRICT DIVISION
TOLL BRIDGE PROGRAM

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

June 15, 1998

Mr. Larry Myers
Native American Heritage Commission
1400 10th Street
Sacramento, CA 95814

Dear Mr. Myers:

Enclosed for your files for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project is a copy of the combined Positive Archaeological Survey Report, Extended Phase I Report for Investigations at CA-SFr-04/H, Evaluation for Historic Archaeological Resources, and Request for Determination of Eligibility for Prehistoric Component of CA-SFr-04/H. One previously recorded site, CA-SFr-04/H, is situated within the Yerba Buena Island portion of the Area of Potential Effects. The prehistoric component of CA-SFr-04/H is considered to be eligible for the National Register of Historic Places under Criterion D. No other prehistoric resources have been identified within the Area of Potential Effects.

Once an alternative is selected and if it affects CA-SFr-04/H, a treatment plan will be prepared and approved by SHPO in order to mitigate the site. Of course we will continue our coordination with NAHC in the review process of a subsequent treatment plan. Data recovery will occur prior to construction activities.

If you have any questions concerning this report, please contact Janet Pape, Environmental Planner, Archaeologist, at 510-286-5616.

Sincerely,

HARRY Y. YAHATA
District Director

By Mara Melandry

MARA MELANDRY
Environmental Manager
SFOBB

Enclosure

c: Andrew A. Galvan

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
OX 23660
OAKLAND, CA 94623-0660
) 286-4444
(510) 286-4454

June 15, 1998

Mr. Andrew A. Galvan
The Ohlone Indian Tribe
P.O. Box 3152
Mission San Jose, CA 94539

Dear Mr. Galvan:

Enclosed for your files for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project is a copy of the combined Positive Archaeological Survey Report, Extended Phase I Report for Investigations at CA-SFr-04/H, Evaluation for Historic Archaeological Resources, and Request for Determination of Eligibility for Prehistoric Component of CA-SFr-04/H. One previously recorded site, CA-SFr-04/H, is situated within the Yerba Buena Island portion of the Area of Potential Effects. The prehistoric component of CA-SFr-04/H is considered to be eligible for the National Register of Historic Places under Criterion D. No other prehistoric resources have been identified within the Area of Potential Effects.

Once an alternative is selected and if it affects CA-SFr-04/H, a treatment plan will be prepared and approved by SHPO in order to mitigate impacts to the site. Data recovery will occur prior to construction of the project.

Thank you, again, for monitoring the extended phase I investigations for CA-SFr-04H. We look forward to working with you in the future if archaeological mitigation is required for this project.

If you have any questions concerning this report, please contact Janet Pape, Associate Environmental Planner, Archaeologist, at 510-286-5615.

Sincerely,

HARRY Y. YAHATA
District Director

By Mara Melandry
MARA MELANDRY
Environmental Manager
SFOBB

Enclosure

c: Larry Myers, Native American Heritage Commission

JUN 18 1998

U.S. Department of Transportation
United States Coast Guard

Commander
Maintenance & Logistics
Command Pacific

Coast Guard Island, Bldg 54D
Alameda, CA 94501-5100
Staff Symbol: sr
Phone: (510) 437-5900
FAX: (510) 437-5753

11011
June 15, 1998

DJM

Mr. Denis Mulligan
Toll Bridge Program Manager
State of California
Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

RECEIVED
JUN 18 1998
B. QUAN

Dear Mr. Mulligan:

In a meeting we had with representatives of your office on June 3rd, 1998, regarding the new eastern span of the San Francisco - Oakland Bay Bridge we were informed that some alternatives for the location of the temporary ramps on Yerba Buena Island would impact the access to our adjacent Coast Guard facilities. I want you to be aware that any location of these temporary ramps, or other portions of your project, that would limit our safe access to these facilities is unacceptable to the Coast Guard. In any acceptable scenario, our Yerba Buena Island facilities require unrestricted, 24-hour, vehicular access from both San Francisco and Oakland. The Coast Guard's ability to perform its critical missions in the San Francisco Bay Area (search & rescue, vessel traffic control, communications, etc.) must remain unhindered.

If you have any questions regarding this matter please contact me at the address above or (510) 437-5900.

Sincerely,

Robert B. Van de Loo

ROBERT B. VAN DE LOO
Realty Specialist
Maintenance & Logistics Command Pacific
By direction of the Commander

Copy: CG GROUP San Francisco
CG VTS San Francisco
CG Aids to Navigation Team San Francisco
CG MLCPAC (se), (sp)
CG CEU Oakland

EXECUTED 98 JUN 18

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

June 22, 1998

The Honorable Mary King
Chair, MTC Bay Bridge Design Task Force
101 Eighth Street
Oakland, CA 94607-4700

Dear Supervisor King:

I am writing at this time to support a request by my East Bay colleagues to postpone the vote on the Bay Bridge replacement project pending further discussion and review. There is no need to rush into a final decision as the current East Span is presently in the process of being retrofitted prior to its replacement. Careful and thoughtful consideration should be given by the region in order to build a new Bay Bridge that will accommodate the needs of the citizenry well into the 22nd century. With an estimated cost of $1.5 billion, the job must be done right the first time and must take into account the concerns of the region as a whole.

Specifically, I am concerned about the future development of Treasure Island and Yerba Buena Island and the impact the currently proposed design will have on the Treasure Island reuse plan adopted in July of 1996. The most recent plans presented by Caltrans significantly impact San Francisco's ability to make the Treasure Island Project financially self-sustaining and have adverse environmental and historic preservation consequences. In addition to these concerns, I also believe that further studies should be done with respect to rail and bike and pedestrian access.

Accordingly, I ask that we defer the decision on the Bay Bridge replacement project as well as issues such as the Transbay Terminal until regional consensus is reached. Let us work together on the most important regional transportation undertaking of the century and build a bridge that will meet the needs of the entire region and be cherished for generations to come.

Thank you for your leadership and for your consideration of San Francisco's tremendous concerns regarding the Bay Bridge replacement project.

Sincerely,

Willie L. Brown, Jr.
Mayor

401 VAN NESS AVENUE, ROOM 336, SAN FRANCISCO, CALIFORNIA 94102
(415) 554-6141
RECYCLED PAPER

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

June 24, 1998

Annemarie Conroy
Mayor's TI Project Office
City and County of San Francisco
410 Palm Avenue, Building #1, Room 229
Treasure Island, San Francisco, CA 94130

Dear Ms. Conroy:

Enclosed for your information for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project is a copy of the Historic Property Survey Report containing an Historic Architecture Survey Report and a combined Positive Archaeological Survey Report, Extended Phase I Report for Investigations at CA-SFr-04/H, Evaluation for Historic Archaeological Resources, and Request for Determination of Eligibility for Prehistoric Component of CA-SFr-04/H.

If you have any questions on the above, please contact Janet Pape, Archaeologist, at 510/286-5615 regarding archaeology and Jared Goldfine, Senior Environmental Planner, at 510/286-6203 for the built environment. Please note that the Archaeological Survey Report contains confidential information and is not for public distribution.

Sincerely,

HARRY Y. YAHATA
District Director

By Mara Melandry
MARA MELANDRY
Environmental Manager
SFOBB

Enclosure

cc: Lou Wall (Department of the Navy)
Susanna Montana (City and County of San Francisco)
Cherilynn Widell (SHPO)
Lieutenant Commander Jon Milkey (USCG)

bc: MMelandry/MMortenson/JPape
JGoldfine/AHope
MBuss, CAdams
Mike Davis, PB

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
KLAND, CA 94623-0660
0) 286-4444
TDD (510) 286-4454

June 26, 1998

Lieutenant Commander Jon Milkey
United States Coast Guard
Group San Francisco
Yerba Buena Island
San Francisco, CA 94130

Dear Lieutenant Commander Milkey:

Enclosed for your information for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project is a copy of the Historic Property Survey Report containing an Historic Architecture Survey Report and a combined Positive Archaeological Survey Report, Extended Phase I Report for Investigations at CA-SFr-04/H, Evaluation for Historic Archaeological Resources, and Request for Determination of Eligibility for Prehistoric Component of CA-SFr-04/H.

If you have any questions on the above, please contact Janet Pape, Archaeologist, at 510/286-5615 regarding archaeology and Jared Goldfine, Senior Environmental Planner, at 510/286-6203 for the built environment. Please note that the Archaeological Survey Report contains confidential information and is not for public distribution.

Sincerely,

HARRY Y. YAHATA
District Director

By Mara Melandry
MARA MELANDRY
Environmental Manager
SFOBB

Enclosure

cc: Susanna Montana (City and County of San Francisco)
Annemarie Conroy (City and County of San Francisco)
Lou Wall (Department of the Navy)
Cherilynn Widell (SHPO)

bc: MMelandry/MMortenson/JPap
JGoldfine/AHope
MBuss, CAdams
Mike Davis, PB

U.S. Department of Transportation
United States Coast Guard

Commander (Pow-2)
Eleventh Coast Guard District

Coast Guard Island
Alameda, CA 94501-5100
Staff Symbol: (Pow-2)
Phone: (510) 437-3514
FAX: (510) 437-5836

16591
San Francisco Bay (8.9)
Ser: 432-98
July 8, 1998

John Schultz
Chief, District Operations
Federal Highway Administration
California Division
980 9th St. Suite 400
Sacramento, CA 95814-2724

Dear Mr. Schultz:

The Coast Guard met with your agency and CalTrans on March 25, 1997 to discuss your letter of March 11, 1998, (encl. 1) in which you agreed to CalTrans request that you assume the role of lead agency status for the San Francisco-Oakland Bay Bridge East Span Replacement Project Project.

Our letters of June 23, 1997, June 24, 1997 and July 15 1997 (encls. 2, 3 and 4) stated that we would be willing to serve as cooperating agency for the replacement. Our letters did not address the contingency, however, that we be listed as cooperating agency if the ultimate decision was to retrofit the bridge. After we commented to CalTrans on July 6, 1998 that we had not been listed as a cooperating agency on the Administrative Draft document for the Seismic Safety project (encl. 5), Ms. Melandry asked us to identify our role for not only the replacement but also the possible retrofit alternatives.

Accordingly, the Coast Guard would be pleased to serve as cooperating agency for East Span Seismic Safety Project in accordance with 40 CFR 1501.6. We must issue a formal bridge permit under Section 9 of the 1899 Rivers and Harbors Act, as amended, for either the replacement or retrofit alternatives being considered. The Coast Guard bridge permit is the federal approval of the location and clearances of a bridge. Our primary consideration is whether the bridge provides safe passage for existing and prospective vessels operating on the waterway. In addition to the permit, we will be involved in the coordination of work evolutions that utilize waterborne equipment or otherwise affect navigational clearances–to minimize impacts navigation.

Our office will also serve as the main point of contact for Coast Guard cooperating agency responsibilities. In that context, we forwarded concerns of our Maintenance and Logistics Command planning and environmental concerns, along with those of our Coast Guard Group San Francisco on Yerba Buena Island as part of our July 6, 1998 letter (encl. 5).

16591
July 8, 1998

If we may be of any assistance, please do not hesitate to contact Mr. Jerry Olmes or me at (510) 437-3514.

Sincerely,

W.R. TILL
Chief, Bridge Section
U. S. Coast Guard
By direction of the District Commander

Encl: (1) Federal Highway Administration letter dated March 11, 1997
(2) My letter dated June 23, 1997
(3) My letter dated June 24, 1997
(4) My letter dated July 15, 1997
(5) My letter dated July 6, 1998

Copy: CalTrans District 04, ATTN Ms. Mara Melandry w/encls

DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-2402

IN REPLY REFER TO:

11011
Ser 62B/L8197-2
Yerba Buena Island
Former NAVSTA TI
16 July 1998

Mr. Nick Fiorentinos
Right of Way Agent
State of California
Department of Transportation
Box 23440
Oakland, CA 94623-0440

Dear Mr. Fiorentinos:

This letter is in response to your correspondence of July 1, 1998 in which you request the Navy to issue a license for access to Yerba Buena Island to perform drilling for geologic investigations for your proposed N6 alignment and two possible detour routes for the new east span of the San Francisco Bay/Oakland Bay Bridge starting 01 August 1998.

Based on the environmental checklist you provided to us in your letter, there is insufficient documentation for us to be able to adequately evaluate the environmental effect of the proposed action or accept your conclusions from an environmental compliance perspective. As I discussed with you in our telephone call on 14 July 1998, in order for us to approve the proposed action, the Navy must first document compliance with applicable environmental laws and regulations. To expedite this process, we propose that you work with our environmental planning staff to prepare such documentation to appropriate standards.

The principal requirement is for a completed National Environmental Policy Act (NEPA) document. The NEPA document should demonstrate and justify a lack of significant resulting impacts to historical and archeological resources, noise, traffic and access, visual/aesthetics, air quality, water quality, grading, erosion, runoff, landscaping, hazardous materials management, the Navy's Installation Restoration hazardous wastes cleanup program, groundwater and aquifers, land use, and biological resources including endangered species.

The NEPA document needs to demonstrate parallel interagency coordination and completed compliance with (a) Section 106 of the National Historic Preservation Act (NHPA) for the highly sensitive historical and archeological resources that could be adversely affected by the drilling program; (b) the Endangered Species Act to assure no rare, threatened or endangered species would be affected; (c) the Clean Water Act

including such possible permits as Section 404, Section 401, NPDES, and Stormwater Management; (d) the Clean Air Act including Conformity calculations; (e) the Coastal Zone Management Act for coastal zone concerns if any; and (f) Executive Order 12898 on Environmental Justice. It also needs to demonstrate parallel interagency coordination with our ongoing Installation Restoration Program at the base.

Our preliminary review finds that the proposed action is likely to have an adverse effect on cultural resources, that our Installation Restoration Program will be significantly impacted and that the proposed action may potentially be controversial. Therefore, we anticipate that an Environmental Assessment (EA) will be necessary for environmental planning and documentation purposes.

If you have completed California Environmental Quality Act documentation for this proposed action, such documentation would be useful in preparing the NEPA documentation. I would estimate that EA preparation may be completed in about one month, but the consultation requirements under the NHPA may take longer.

As we also agreed in our telephone conversation, a meeting of our offices should be scheduled as soon as possible to facilitate completion of this effort. Based on the availability of Navy staff, I propose we meet on 21 July 1998 at 1:00 PM in our San Bruno offices. If this is inconvenient, we can schedule another date. I may be reached at (650) 244-3004. My pager number is (650) 869-7945.

Sincerely,

Kenn Parsons
Base Conversion Manager
Former Naval Station Treasure Island

Distribution:
Mara Melandry, CALTRANS
Annemarie Conroy, City of San Francisco

STATE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION

BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

July 17, 1998

Ms. Annemarie Conroy
Executive Director
Mayor's Treasure Island Project Office
410 Palm Avenue
Building 1, Room 229
San Francisco Treasure Island, CA 94130

Dear Ms Conroy:

Caltrans is moving forward aggressively with the San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project. At this current juncture, it is necessary to account for foreseeable future loading on the proposed structures.

Previously, Mr. Mark Primeau had contacted Caltrans regarding attaching a 12-inch sanitary sewer line on the west spans of the SFOBB. A copy of the 1996 correspondence is attached. The west spans of the SFOBB cannot accommodate the then-proposed sewer line; however, the East Span Seismic Safety Project offers San Francisco an opportunity to revisit pumping offsite raw wastewater generated on Treasure Island and Yerba Buena Island for ultimate treatment and disposal.

Likewise, we have had previous discussions with the City regarding the 12-inch secondary water supply line on the existing east span which is currently owned by the Navy. We would like to know if the City intends on reconstructing this line on the new east span.

In order to move this crucial public safety project forward, we need to reach resolution on these as well as other Yerba Buena Island issues.

Caltrans looks forward to working with San Francisco and the Department of the Navy on the successful conversion of this former Naval facility. Please contact me at your earliest convenience to discuss this further. My phone number is (510) 286-6293.

Sincerely,

HARRY Y. YAHATA
District Director

By Denis Mulligan

DENIS J. MULLIGAN
Program Manager
Toll Bridge Program

HYY, HPH, RJMacpherson,
BMARONEY, SHULSELBUS,
MMELANDRY, ADE, KTERPSTRA,
DAN MURPHY, DJMulligan, K. Greve
cc:Steve Heminger

Attachment

cc: Mark A. Primeau, CCSF Director of Public Works
Maria Ayerdi, CCSF Special Assistant to the Mayor

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
-~X 23660
:LAND, CA 94623-0660
·0) 286-4444
(510) 286-4454

June 28, 1996

Mr. Mark A. Primeau
Director of Public Works
City and County of San Francisco
875 Stevenson Street, Suite 410
San Francisco, CA 94103-0934

Dear Mr. Primeau:

Your proposal to install a 12" diameter sewer line on the San Francisco-Oakland Bay Bridge has been reviewed by our staff and found incompatible for the following reasons:

1. There is no suitable location for this pipe. The area under the north upper deck sidewalk is taken by an existing 10-inch diameter water pipe. The area under the south upper deck sidewalk must be kept clear to provide access to the many electrical conduits located there. Placing the pipe under the lower deck would present structural problems (if the pipe went through the floor beams) or would prevent the operation of the existing upper deck traveling scaffolds (if the pipe went under the floor beams). If the pipe were placed outside of the truss structure it would prevent the operation of the existing truss web scaffolds.

2. The pipe would place an additional dead load on the structure, which is already at the limit of capacity.

3. The pipe would interfere with the painting and normal maintenance of the bridge by Caltrans forces.

4. The design of expansion joints to handle temperature and seismic movement (up to six feet of seismic longitudinal movement) may prove difficult. We are concerned about the possibility of failure and leakage from the pipe. Failure or leakage would present a severe health hazard to the traveling public and result in contamination of the Bay.

5. The proposed installation does not appear to meet the conditions for permits as shown in the attached Section 600 Utilities Permits.

If you need additional information on this matter, please call Mr. Robert J. Guinn, Office Chief of Maintenance and Toll Bridge Engineering, at (510) 286-4500.

Sincerely,

JOE BROWNE
District Director

Attachment

RJG/ls

cc: JBrowne, HYahata, PHensley, DOdell, GBehm, RMurphy, GBattaglini, RGuinn, CBianchini, KTerpstra, JGallippi

epartment of Public Works

Office of the Director

June 5, 1996

Subject: Treasure Island Reuse Plan

Mr. Joe Browne, District Director
Dept. of Transportation, District 04
P.O. Box 23660
Oakland, CA 94623-0660

Dear Mr. Browne:

The Navy is expected to close their facilities and end operations on Treasure Island (TI), and Yerba Buena Islands (YBI) in San Francisco Bay by September 1997. The City and County of San Francisco is planning to take over and reuse TI and YBI.

Part of the City's responsibilities will include providing sewerage and wastewater treatment services for the tenants of TI and YBI. One option we would like to consider is pumping the raw wastewater generated on the islands to San Francisco for ultimate treatment and disposal. This would require hanging a 12" diameter ductile iron pipe on the Bay Bridge. Is this possible? If not, can the seismic upgrading of the Bay Bridge include provisions for adding a pipe in the future?

If you need more information on this matter, please call Mr. Vitaly B. Troyan, Deputy Director for Public Services, at 554-5803.

Sincerely,

Mark A. Primeau
Director of Public Works

415) 554-6920 Fax (415) 554-6944 875 Stevenson Street, Room 410 San Francisco 94103-0934

ARTMENT OF TRANSPORTATION
3660
D, CA 94623-0660
1444
) 286-4454

August 4, 1998

Lou Wall, Cultural Resource Manager
Department of the Navy
Engineering Field Activity, West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, CA 94066-2402

Dear Mr. Wall:

Enclosed for your information is one copy each of the Finding of Effect reports for archaeological and historic properties for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project in San Francisco and Alameda counties. These reports were sent to FHWA on August 3, 1998 and FHWA will send them to SHPO. We have requested to receive SHPO's review on effects by September 1, 1998.

If you have any questions concerning archaeology, please contact Mara Melandry at 510/286-5582 and for the built environment, contact Jared Goldfine at 510/286-6203.

Sincerely yours,

HARRY Y. YAHATA
District Director

by: Mara Melandry
MARA MELANDRY
SFOBB Environmental Manager

Enclosures

c: Kenn Parsons, Dept. of the Navy
Patricia Duff, Dept. of the Navy
SHPO - Ref. #FHWA980717A
Annemarie Conroy, TI, SF
Danielle Huey, Naval Facilities Engineering Command (enc.)

PORT OF OAKLAND

VIA FAX
650-755-1370

August 10, 1998

Mr. Jon Rubin
Bay Relations, Inc.
2171 Junipero Serra Blvd. Suite 280
Daly City, California 94014

Re: San Francisco - Oakland Bay Bridge:
Impacts of Southern Alignment on Port of Oakland Expansion

Dear Mr. Rubin:

As you requested, I have quantified and summarized the potential impacts of the so-called 'Southern Alignment' of the eastern span of the Bay Bridge. They are attached.

In addition to the economic considerations, please note the following:

The so-called "Bay Bridge Terminal" is the last site at the Port of Oakland which is capable of being developed into major container terminal. Although not anticipated to be constructed until 2010 or beyond, it is designated in the *San Francisco Bay Area Seaport Plan* as a preferred terminal site to satisfy long-term regional needs. Given the stringent fill requirements imposed by BCDC, the significance of this designation cannot be overstated. In addition, the elimination in the Seaport Plan of approximately 200 acres of 'Port Priority Use' area to accommodate alternative redevelopment opportunities in Alameda makes it even more imperative to secure as much potential terminal space at the Port of Oakland.

For these reasons, the site is considered to be one of the most important strategic assets in the Port's inventory of expansion opportunities. Loss of use of even a portion of the site represents an 'opportunity cost' of major proportions.

530 Water Street ■ Jack London Square ■ P.O. Box 2064 ■ Oakland, California 94604-2064
Telephone (510) 272-1100 ■ Fax (510) 272-1172 ■ TDD (510) 763-5703 ■ Cable address, PORTOFOAK, Oakland

In addition to the Port's needs, there are several projects underway or in planning stages, which would be adversely affected by the southern alignment. These include Caltrans' plans to provide for public access to the end of the 'spit', a mitigation commitment associated with the reconstruction of the Cypress Freeway. To date this project has been unquantified. I assume that MTC or Caltrans would account for the impacts of the southern alignment on the mitigation project when the preferred alignment alternative is finalized.

Additionally, the Port is currently working with Caltrans, the East Bay Regional Park District, and the City of Oakland to develop a suitable gateway image to the East Bay, by consolidating land holdings on the southern edge of the spit peninsula, and converting the 16+ resultant acres into a recreational opportunity. Preliminary estimates of the cost of this project are $5,000,000 to $7,000,000. The southern alignment will elimnate our ability to facilitate the development of the park. This issue is a very sensitive in the West Oakland community.

As I mentioned on the phone this morning, the material presented here requires some explanantion of the assumptions and methodologies employed. I will be happy to go over it with you, at your convenience. Please give me a call today at 510-272-1578.

Sincerely,

Richard J. Wiederhorn
Planning Manager

cc: Supervisor Mary King
Bill Hein, MTC
Charles W. Foster, Port of Oakland
Ray Boyle, Port of Oakland

August 10, 1998

SAN FRANCISCO - OAKLAND BAY BRIDGE SOUTHERN ALIGNMENT

Summary: Estimated Impact on Port of Oakland Proposed Bay Bridge MarineTerminal

A. San Francisco Bay Area Seaport Plan (BCDC and MTC, updated February 1996):
Attachment A - Port of Oakland:

Current: 802 Acres Container Terminals
31 Acres Break Bulk Terminal (Burma Road Terminal, adjacent to proposed Bay Bridge Terminal)
60 Acres Dry Bulk Terminal (Schnitzer Steel)

893 Acres + Associated Port Priority Use Area

Proposed: Bay Bridge Container Terminal: 100-Acre Container Terminal Expansion

Total = 902 Acres Container Terminal = 12.5% Port Terminal Acres Expansion

Additional Considerations:

"Loss" of 200+ Designated Port Priority Use Area @ NAS Alameda
= Extra Pressure to Expand Oakland Terminals over Long Term

B. Bay Bridge Terminal

Anticipated construction start 2015

Est. Total Construction Cost (2015 $):	$281.3 Million
Est. Total Mitigation Cost	$ 70.3 Million
Est. Project Cost	$351.6 Million

Est. Annual Revenue Requirements:	$45.0 Million
Est Loss of Revenue Due to South Alignment	$ 6.7 Million Annually
Est. 30-Yr. Revenue Loss @ NPV:	$81.7 Million

vs. $1.5M @ 4% per annum

Port of Oakland - "New" Bay Bridge Terminal

Estimated Construction Costs - Calender Year 2015

Project	Quantities		Rate	Cost	
INFRASTRUCTURE					
Dikes (3)	6,100	feet	$ 4,000	$ 24,400,000	
Fill - 100acres (30 ft)	6,500,000	cu. yds.	$ 8.00	$ 52,000,000	
subtotal				$ 76,400,000	
Eng & OH			20%	$ 15,300,000	
Total Infrastructure Costs					$ 91,700,000
TERMINAL					
Wharf	2,400	feet	$ 20,000	$ 48,000,000	
Container Yard	100	acres	$ 500,000	$ 50,000,000	
Cranes	6	cranes	$ 10,000,000	$ 60,000,000	
subtotal				$ 158,000,000	
Eng & OH			20%	$ 31,600,000	
Total Terminal Costs					$ 189,600,000
Total Construction Costs					**$ 281,300,000**
MITIGATION					
Estimated Cost			25%		$ 70,300,000
Total Project Costs					**$ 351,600,000**

Port of Oakland - "New" Bay Bridge Terminal

Projected Revenue - Beginning Calendar Year 2017

Annual Revenue Needs				
Total Project Cost	$ 351,600,000			
Acreage		100		
Square Feet		4,368,000		
Bond Funding Rate			5.50%	
Coverage Rate			60.00%	
Land Value / Sq. Ft.				$ 15.00
Return on Land				10.00%
Funding Costs		Factor	Amount	
Debt Service		0.06844	$ 24,063,504	
Coverage		0.041064	$ 14,438,102	
Total Debt Service				$ 38,501,606
Land Value	Land Value		Return	
Market	$ 15.00	$ 65,340,000	10.00%	$ 6,534,000
Total Annual Revenue Needs				$ 45,035,606
New" Bay Bridge Terminal				
Minimum Annual Revenue Guarantee				$ 45,035,606
Annual Loss of Revenue			15.00%	$ 6,755,341
30 Year Revenue @ NPV				
Years & NPV Rate		30	7.25%	

Sheet2 NBBT-CST.XLS
8/7/98
2:27 PM

3419

DRAFT

SAN FRANCISCO BAY AREA SEAPORT PLAN

A REPORT TO THE

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

AND THE

METROPOLITAN TRANSPORTATION COMMISSION

FEBRUARY 10, 1996

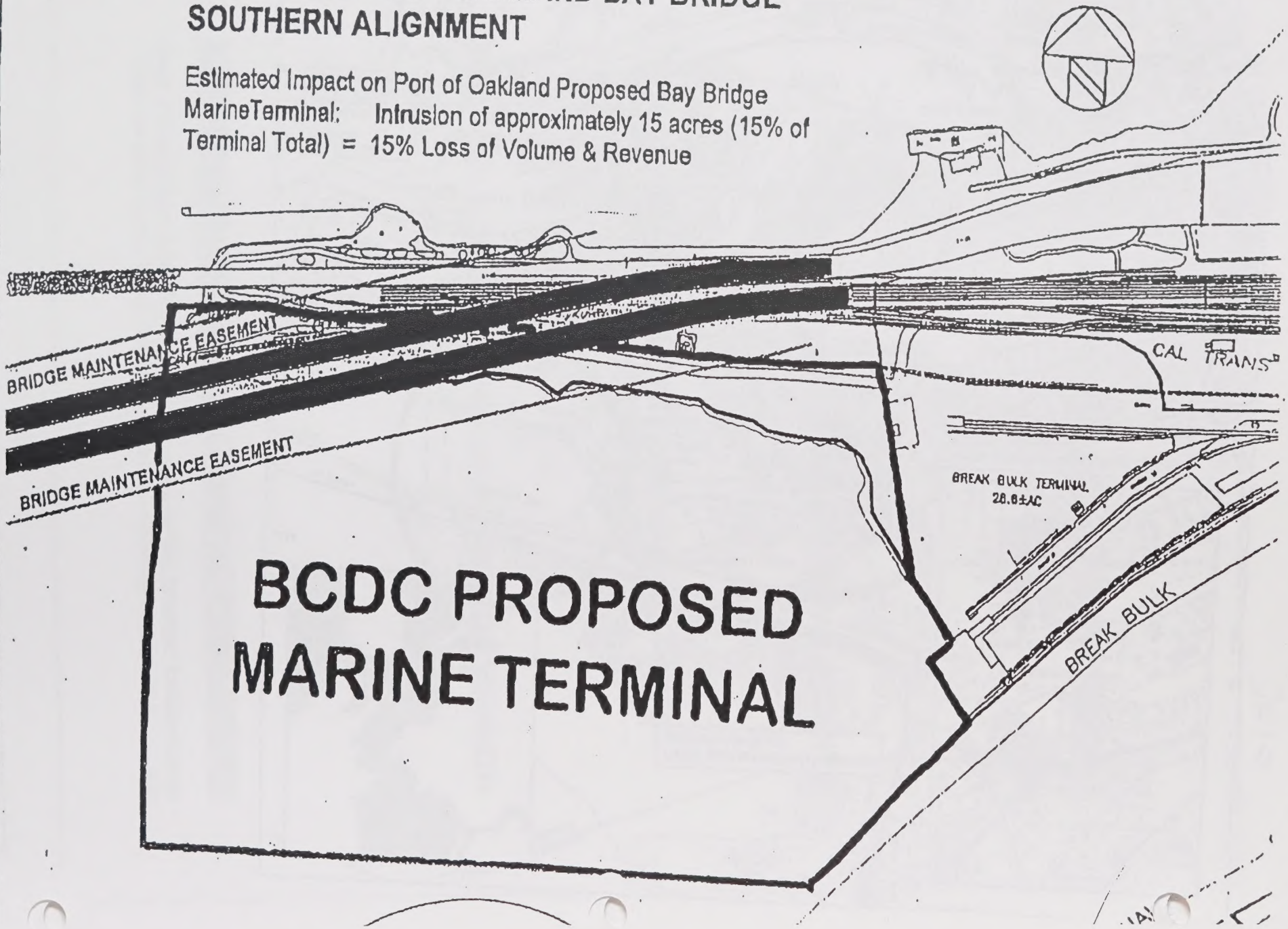
SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
Thirty Van Ness Avenue • Suite 2011 • San Francisco, California 94102 • (415) 557-3686

37

Oakland and Encinal Terminals

SAN FRANCISCO - OAKLAND BAY BRIDGE SOUTHERN ALIGNMENT

Estimated Impact on Port of Oakland Proposed Bay Bridge MarineTerminal: Intrusion of approximately 15 acres (15% of Terminal Total) = 15% Loss of Volume & Revenue



Dahms / Heinl Fleming re: response

SACRAMENTO ADDRESS
STATE CAPITOL, ROOM 2057
SACRAMENTO, CA 95814
(916) 445-0503

EMAIL: SENATOR.KOPP@SEN.CA.GOV

DISTRICT OFFICE
1 JUNIPERO SERRA BLVD.,
SUITE 530
DALY CITY, CA 94014-1980
(650) 301-1721

California State Senate

STATE SENATOR
QUENTIN L. KOPP
EIGHTH SENATORIAL DISTRICT
REPRESENTING SAN FRANCISCO AND SAN MATEO COUNTIES

August 10, 1998

Mr. Larry Dahms
Executive Director
Metropolitan Transportation Commission
101 Eight Street
Oakland, CA 94607

Dear Larry:

As you know, the mayors of San Francisco, Oakland, Berkeley and Emeryville are attempting to delay the Bay Bridge seismic safety replacement project by requesting a redesign of the bridge to include light or heavy rail tracks in lieu of several traffic lanes. I would appreciate estimates on the following factors related to such proposal:

1. The time delay and related safety risk associated with a redesign of the currently accepted Bay Bridge replacement project, including time for necessary reviews, public hearings, and reengineering.
2. The estimated cost associated with building a light or heavy rail line on the Bay Bridge and the corresponding connector lines to ensure a viable transit service.
3. The source of funds for the costs noted above and the impact of the use of such funds on other transportation projects slated for the Bay Area.
4. The impact on transbay congestion of eliminating two traffic lanes for the provision of light or heavy rail tracks during peak hours, off-peak hours and weekends.
5. The ridership estimates for new riders who would use a light or heavy rail service across the Bay Bridge to San Francisco in the west and the Union Pacific railway tracks to Sacramento in the east, or any other currently proposed transit juncture in the East Bay, as well as an estimate of the ridership reduction on existing transit service.

Thank you for your time and attention.

Sincerely yours,

Quentin L. Kopp

QUENTIN L. KOPP

QLK:jkl

U.S. Department of Transportation
United States Coast Guard

Commander (Pow-2)
Eleventh Coast Guard District

Bldg. 50-6
Coast Guard Island
Alameda, CA 94501-5100
Phone: (510)437-3514
FAX: (510)437-5836

16591
San Francisco Bay (8.9)
Ser: Pow 541-98
August 12, 1998

CalTrans District 04, ATTN: Ms. Mara Melandry
District Branch Chief, Environmental Review Alameda I
Box 23660
Oakland, CA 94623-0660

Dear Ms. Melandry:

Please reference your e-mails of August 11 and 12, 1998 to Mr. Jerry Olmes of my staff regarding Coast Guard policy concerning bridge removal. The Coast Guard Bridge Administration Manual, Commandant Instruction M16590.5A, requires that temporary structures (e.g. falsework, work trestles) be removed in their entirety. It also requires that any part of bridges which are replaced (except those parts incorporated in the new bridge) be removed down to the natural bottom of the waterway, or such elevation as may be required by the U.S. Army Corps of Engineers (to prevent interference with navigation improvement or flood control projects), or to an elevation deemed appropriate by the District Commander.

I recommend you ask the U.S. Army Corps of Engineers San Francisco District if they plan any projects to deepen any part of the area beneath the existing East San Francisco–Oakland Bay Bridge. Absent any additional requirements for navigation or flood control imposed by the U.S. Army Corps of Engineers, we would require removal of the existing East Bay Bridge piers to the mudline. More extensive removal in some areas could adversely impact BART's Transbay Tube.

Please do not hesitate to contact Jerry or me if we may answer any other questions. We can be reached at (510) 437-3514.

Sincerely,

W.R. TILL
Chief, Bridge Section
U.S. Coast Guard
By direction of the District Commander

Copy: U.S. Army Corps of Engineers; ATTN: Ms. Victoria Alvarez, Regulatory Branch
Coast Guard Group San Francisco, MSO San Francisco, MLCPAC(s)

STATE OF CALIFORNIA — THE RESOURCES AGENCY PETE WILSON, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO 94296-0001
(916) 653-6624
FAX: (916) 653-9824

August 13, 1998
REPLY TO: FHWA980717A

Jeffrey A. Lindley, Division Administrator
Federal Highway Administration
980 9th Street, Suite 400
SACRAMENTO CA 95814-2724

Re: Bay Bridge East Span Seismic Safety Project, San Francisco and Alameda Counties.

Dear Mr. Lindley:

Thank you for submitting to our office your July 14, 1998 letter and supporting Historic Property Survey Report (HPSR), Historic Architecture Survey Report (HASR), and Positive Archeological Survey Report (PASR) for the Bay Bridge East Span Seismic Safety Project located in San Francisco and Alameda Counties. Three alternatives are being considered by Caltrans for this project. They include:

- A no-build alternative that would maintain the structure in its current condition with no seismic strengthening;
- Retrofitting the existing structure to meet existing seismic standards;
- Replacement of the existing structure with a new bridge on a new alignment. Details of the options involving this new structure are outlined in the Project Description of the HPSR.

You are seeking our comments on your determination of the eligibility of eight pre-1948 structures and one archeological site (CA-SFr-04/H) located within the project Area of Potential Effects (APE) for inclusion on the National Register of Historic Places (NRHP) in accordance with 36 CFR 800, regulations implementing Section 106 of the National Historic Preservation Act. Our review of the submitted HPSR, HASR, and PASR leads us to concur with your determination that the following properties are eligible for inclusion on the NRHP under the following criteria as defined by 36 CFR 60.4:

- Navy Quarters 10 - Criterion C at the local level of significance.
- Navy Building 267 - Criterion C as a contributor to the Navy Quarters 10 property.

- Bay Bridge Oakland Substation - Criterion A as a contributor to the San Francisco - Oakland Bay Bridge.

- Key Pier Substation Oakland - Criterion A as a contributor to the San Francisco - Oakland Bay Bridge.

The aforementioned buildings have strong associations with the earliest historical period of significance for the San Francisco - Oakland Bay Bridge (1936-1948) and have retained the integrity of design and materials associated with this period.

We also concur provisionally with your determination that the remaining four pre-1948 structures listed and evaluated in the HPSR are not eligible for inclusion on the NRHP under any of the criteria established by 36 CFR 60.4. We will provide you with our final response on this issue pending receipt of information evidencing that FHWA solicited the comments of the Navy and Coast Guard on the eligibility determination made for these properties.

With regard to CA-SFr-04/H, we agree that the prehistoric component of this site may contribute to its potential eligibility under Criterion D. However, in that the site has yielded and may again yield human remains, its potential significance may extend beyond Criterion D. This should be noted in your reports and correspondence. In addition, we agree first that the historic component of the site associated with the Naval Training Station may have severely compromised integrity and secondly, that further research may be needed to address the status of the component which may be associated with the Army Post and Depot.

We would not classify the prehistoric component of this site to be potentially eligible nor characterize the Naval Training Station portion of the historic component to be ineligible. A more appropriate description would deem these components to be either contributing or non-contributing to the potential eligibilty of the site as a whole. We request that your documents reflect this characterization.

Thank you again for seeking our comments on your project. If you have any questions, please contact staff historian Clarence Caesar at (916) 653-8902.

Sincerely,

Daniel Abeyta
Deputy State Historic Preservation Officer

METROPOLITAN
TRANSPORTATION
COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
Tel.: 510.464.7700
TTY/TDD: 510.464.7769
Fax: 510.464.7848
e-mail: info@mtc.ca.gov
Web site: www.mtc.ca.gov

August 17, 1998

The Honorable Quentin L. Kopp
California State Senate
State Capitol, Room 2057
Sacramento, CA 95814

Dear Senator Kopp:

In reply to your letter of August 10, 1998 requesting MTC "estimates" on the impact of instituting rail service on the Bay Bridge, most of the questions you pose are difficult to answer definitively without performing a detailed planning and engineering analysis. However, based on the information available to us at present, let me respond to your questions in the order you raised them.

1. The time delay and related safety risk associated with a redesign of the currently accepted Bay Bridge replacement project, including time for necessary reviews, public hearings, and reengineering.

Caltrans' current schedule calls for completion of design by July 1999, beginning construction in March 2000, and completing construction in 2004. Assuming that funds could be made available to finance any redesign of the new eastern span and existing western span to include rail service, the delays caused by additional environmental review, design work, and public hearings for incorporating light rail service on both spans of the bridge could be 18-24 months. Incorporating heavy rail service would not only entail additional environmental and public review but conceivably a different bridge type selection for the new eastern span due to the much heavier loadings. Thus, redesigning for heavy rail service could result in delays of 30-36 months.

2. The estimated cost associated with building a light or heavy rail line on the Bay bridge and the corresponding connector lines to ensure a viable transit service.

Light and heavy rail are two very different options. The existing bridge was designed to accommodate essentially what we could call light rail today. The new east span is being designed to accommodate similar loadings. Adding light rail to the bridge would require taking one traffic lane and one shoulder in each direction of the new span, and at least one traffic lane -- but quite possibly two traffic lanes -- in each direction through the existing tunnel and west suspension span.

According to Harre Demoro's two-volume history of the Key System trains (The Key Route: Transbay Commuting by Train and Ferry, Interurban Press, Glendale, CA, 1985), the old Key trains operated on 66 miles of track on the bridge and throughout numerous East Bay cities. At current per mile costs of building comparable light rail systems ($40-45 million per mile), the cost to

replicate the Key System would be $2.6-3.0 billion -- exclusive of modifications to the tunnel, the western span, and access facilities in San Francisco from the bridge to the Transbay Terminal (which would be substantial) and operating subsidies.

It is worth elaborating on the extensive access modifications that are not included in the above cost estimate. Access at both ends of the bridge would present a unique engineering challenge. In San Francisco, the existing highway ramps would have to be modified to carry the rail system into the Transbay Terminal. In Oakland, access would have to cross land currently designated for port use and a proposed park at the touchdown of the new eastern span.

Heavy rail is a totally different proposition. Although there is no historical precedent for heavy rail service on the bridge, the cost of instituting such service could exceed the $3 billion estimate for light rail for the following reasons. As noted above, the eastern span replacement would have to be redesigned. Two traffic lanes in each direction in the tunnel and on the existing suspension span would be required for rail service, unless the tunnel and western span were reconfigured to their pre-1958 state with rail on the lower deck and autos on the top deck -- which would restrict the auto capacity of the bridge even further.

Moreover, since the suspension span originally was designed to accommodate light rail service, it is likely that the western half of the bridge would require further strengthening to carry heavy rail loads. In the alternative, a new tunnel and bridge could be built from the island to San Francisco. Access for heavy rail in San Francisco also would be much more complicated than for light rail, and would probably require the demolition and replacement of a number of highway structures as well as substantial modifications to the Transbay Terminal itself.

3. The source of funds for the costs noted above and the impact of the use of such funds on other transportation projects slated for the Bay Area.

Current transportation funding sources identified in MTC's Regional Transportation Plan are not only fully subscribed for the next 20 years, but will be unable to cover $6.5 billion in costs just to operate and maintain the existing transportation system over that period. Thus, instituting rail service on the bridge would require new taxes or fees. The most likely funding source would be a further increase in bridge tolls.

The $1 seismic retrofit surcharge on all seven Bay Area state-owned toll bridges is expected to generate approximately $115 million per year; of this amount, $45 million will be generated on the Bay Bridge alone. The revenue generated by any further toll increases to finance rail service on the bridge could be reduced significantly by two factors: (1) diversion of motorists to other bridges or travel modes due to higher congestion levels caused by removing traffic lanes for rail on the Bay Bridge; and (2) the elasticity associated with higher toll levels. Ignoring these impacts for the moment,

however, we estimate that tolls would have to be raised by at least $2 on all state-owned bridges -- or by about $6 if the project were to be financed by Bay Bridge tolls alone -- to finance a $3 billion bond issue for reinstating light rail service on the bridge. The heavy rail option could entail even higher costs and higher toll levels.

4. The impact on transbay congestion of eliminating two traffic lanes for the provision of light or heavy rail tracks during peak hours, off-peak hours, and weekends.

As the question implies, instituting rail service on the Bay Bridge would require the removal of 2-4 traffic lanes on the existing western span of the bridge. This would reduce the vehicular carrying capacity of the bridge (including for buses and other high occupancy vehicles) by 20-40%. Since traffic congestion bears more of a geometric than linear relationship to capacity (i.e. small reductions in capacity can result in large increases in delay), traffic congestion would be expected to increase by considerably more than 20-40%. The increased delay could be mitigated somewhat by diversion of commuters to the new rail service or other transit alternatives in the corridor. Congestion would be worse during peak hours than during off-peak hours or weekends.

5. The ridership estimates for new riders who would use a light or heavy rail service across the Bay Bridge to San Francisco in the west and the Union Pacific railway tracks to Sacramento in the east, or any other proposed transit juncture in the East Bay, as well as an estimate of the ridership reduction on existing transit service.

We would expect modest peak period ridership on any heavy rail service that connected to the Capitols intercity service since 92% of westbound Bay Bridge auto work trips originate in Alameda and Contra Costa counties, which are served by BART and AC Transit transbay service. The Capitols primarily serve Solano, Yolo, and Sacramento county intercity trips, which comprise a tiny fraction of Bay Bridge peak traffic. If, on the other hand, the proposal were to reinstitute light rail service in the old Key System service area, such service would overlap significantly with existing BART and AC Transit service -- indeed, many AC Transit transbay routes still bear the letter designations of old Key routes. In that case, Bay Bridge rail service might attract more peak period patrons, but many would likely be at the expense of BART or AC Transit.

I hope this information is responsive to your inquiry. If you need further assistance, please contact Steve Heminger of my staff at (510) 464-7810.

Sincerely,

William F. Hein
Deputy Executive Director

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

ARIZONA
CALIFORNIA
NEVADA
HAWAII
GUAM
AMERICAN SAMOA
N. MARIANA IS.

August 18, 1998

IN REPLY REFER TO
HA-CA
File #:04-ALA/SF-80
Document #: P19369

Mr. Harry Yahata, District Director
Caltrans, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Attention: Mara Melandry

Dear Mr. Yahata:

SUBJECT: CONCURRENCE FROM SHPO ON HPSR, HASR, AND PASR FOR SFOBB

Enclosed for your use is a copy of the State Historic Preservation Officer's (SHPO) August 13, 1998, letter regarding the Historic Property Survey Report (HPSR), Historic Architecture Survey Report (HASR), and Positive Archeological Survey Report (PASR) for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project located in San Francisco and Alameda Counties.

The SHPO concurs that the following properties are eligible for inclusion on the National Register of Historic Places (NRHP) under the criteria as defined by 36 CFR 60.4: Navy Quarters 10, Navy Building 267, Bay Bridge Oakland Substation, and Key Pier Substation Oakland.

With regard to Archaeological Site (CA-SFr-04/H), the SHPO believes that the site may again yield human remains, its potential significance may extend beyond the current eligibility Criterion D. Further research may be needed to address the concerns addressed in SHPO's letter.

The SHPO also requests that the prehistoric component of the above site be appropriately described as either contributing or non-contribution to the potential eligibility of the site as a whole. Their concerns are to be reflected in the documents.

If you have any questions, please contact Bill Wong at (916)498-5042.

Sincerely,

John R Schultz

For
Jeffrey A. Lindley
Division Administrator

Enclosure

E OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

PARTMENT OF TRANSPORTATION

3660
O, CA 94623-0660
4444
(510) 286-4454

August 19, 1998

Mr. Daniel Abeyta
Deputy State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942986
Sacramento, California 94623-0001

Attn: Mr. Hans Kreitsberg

Re: Bay Bridge East Span Seismic Safety Project-San Francisco and Alameda Counties/SHPO Reference- FHWA 980717A

Dear Mr. Abeyta:

Thank you very much for your August 13, 1998 letter commenting on the Historic Properties Survey Report (HPSR) and supporting documents regarding determination of eligibility. In order to expedite concurrence on eligibility, Mr. Bill Wong of the Federal Highway Administration has authorized Caltrans to submit the additional information you requested directly to your office.

With respect to coordination and solicitation of comments from the U.S. Navy and the Coast Guard, attached you will find a summary of staff contacts with the two aforementioned agencies and letters transmitting copies of the HPSR.

In regard to CA-SFr-04/H we agree that since the site has contained and may again yield human remains, its potential significance may extend beyond Criterion D. This issue will be addressed in the any future research and reports. The prehistoric component of CA-SFr-04/H is a contributing element to the potential eligibility of this site; however, the Naval Training Station is a non-contributing element. Results of research will be forthcoming which will address whether the Army Post and Depot and/or American Period civilian era occupation are contributing or non-contributing components to the potential eligibility of the site as a whole. This characterization will be reflected in any future documents.

We appreciate the efforts of the SHPO staff in reviewing this critical project. If there are any questions, please call Jared Goldfine, Senior Environmental Planner at (510) 286-6203.

Sincerely,

HARRY Y. YAHATA
District Director

by

Jared Goldfine FOR

ROBERT GROSS
Office Chief
Environmental Planning South

attachments

cc. Federal Highway Administration

c.c. M MELANDRY - FHWA, BATON ROUGE

AUG 2 2 1998

ATE OF CALIFORNIA — THE RESOURCES AGENCY PETE WILSON, Governor

FFICE OF HISTORIC PRESERVATION
EPARTMENT OF PARKS AND RECREATION
OX 942896
AMENTO 94296-0001
16) 653-6624
X: (916) 653-9824

August 21, 1998
REPLY TO: FHWA980717A

Harry Y. Yahata, District Director
California Department of Transportation
District 4
Box 23660
OAKLAND CA 94623-0660

Re: Bay Bridge East Span Seismic Safety Project, San Francisco and Alameda Counties.

Dear Mr. Yahata:

On behalf of the Federal Highway Administration (FHWA), thank you for submitting to our office your August 19, 1998 letter and supporting documentation regarding your response to comments contained in our letter of August 13, 1998 addressing the evaluation of the Bay Bridge East Span Seismic Safety project, located in San Francisco and Alameda Counties. Our letter requested additional information from FHWA and Caltrans regarding the following issues:

- information evidencing that FHWA solicited the comments of the Navy and the Coast Guard on the eligibility of four pre-1948 properties that were determined ineligible for inclusion on the National Register of Historic Places (NRHP) in the submitted Historic Property Survey Report (HPSR).

- evidence that your documentation on the National Register eligibility of the pre-historic component of CA-SFr-04/H reflects whether the components are contributing or non-contributing elements to the potential eligibility of the site as a whole.

Based on our review of the information contained in your submitted documentation, we can now conclude that FHWA and Caltrans have addressed, to our satisfaction, the issues raised in our previous letter. As such, we can now concur that the four aforementioned pre-1948 properties listed in the HPSR are ineligible for inclusion on the NRHP and that the description provided in your subsequent documentation regarding the pre-historic component of CA-SFr-04/H is an appropriate characterization of the site.

Thank you again for seeking our comments on you project. If you have any questions, please contact staff historian Clarence Caesar at (916) 653-8902.

Sincerely,

Daniel Abeyta
Deputy State Historic Preservation Officer

cc: Jeffrey A. Lindley, FHWA

'E OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

PARTMENT OF TRANSPORTATION
3660
ND, CA 94623-0660
, 286-4444
(510) 286-4454

September 1, 1998

Ms. Irma Lagomarsino
National Marine Fisheries Service
SW Region
501 W. Ocean Blvd. Suite 4200
Long Beach, California 90802-4213

Subject: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project

Dear Ms. Lagomarsino:

This letter is to inform you of the potential for blasting to be used in the construction of replacement bridge alternatives for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project (East Span Project). Although an alternative has not been selected, the Department of Transportation (Caltrans) would like to receive your input on potential concerns associated with blasting in San Francisco Bay. We also request that you describe data requirements needed to determine if impacts would occur to harbor seals and if an incidental take permit should be pursued. Figures of the project area are attached indicating the location of the harbor seal haul-out site and the potential blasting site.

The following description of potential blasting is based on a construction contractor's review of the project's conceptual engineering.

The in-bay blasting and rock excavation would be used to create a rock bench in the sloping bedrock for a single bridge tower foundation. It would be one of the early work activities on the project and would begin within the second month after receiving a notice to proceed (currently estimated to be February 2000). The rock bench to be excavated is located at Station 57+78, approximately 80 meters northeast from the northeast end of Yerba Buena Island (see attached map). Assuming the rock bench is to be located at an elevation of -22 meters, the rock blasting would take place from -10 meters to -25 meters below water level.

The most economical and efficient method of blasting the rock would be to drill all the blast holes and set off one large explosion using millisecond delays. The rock bench is required for drilling the cast-in-drilled-holes piles. Approximately 25 footings would need to be drilled into the rock bench to support the main tower. This would require the removal of approximately 10,000 cubic meters of rock. Using an average of 7 pounds per cubic-meter of drilled rock, it is estimated that approximately 70,000 pounds of explosive would be required. The explosives that are normally used

in consolidated rock formations are water gels, which can be pumped through a square shaft that drives the drilling bit (drilling kelly bar). If this one explosion generates shock waves that are not acceptable, the area could be divided into 2 or 3 sections and then separate drilling and blasting of each section could be possible; however, this requires more time and expense. If the excavation area is divided into 2 or more sections, then the recommended procedure would be to drill, blast, and excavate the first section, before drilling the next section. This procedure would have several explosions spaced days or weeks apart, depending on the amount of time required to drill, blast, and excavate each section. The total duration of the blast would be 500 milliseconds, assuming 50 millisecond delays between drill hole rows for 10 rows. This total time would apply to one explosion or to 3 separate explosions, as the number of rows would not change. It is also recommended that all overburden, approximately 2 - 5 meters deep, be excavated down to the rock layer prior to starting the drill and blast operations.

If you have questions concerning this request, please contact me at 510/286-5582. We would be happy to arrange a field review or meeting if you so desire.

Sincerely,

HARRY Y. YAHATA
District Director

By

Mara Melandry

MARA MELANDRY
Environmental Manager, SFOBB
Toll Bridge Program

Enclosures:
Location Map
c: Becky Ota (CDFG)

STATE OF CALIFORNIA — THE RESOURCES AGENCY

PETE WILSON, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO 94296-0001
(916) 653-6624
FAX: (916) 653-9824

September 10, 1998

Reply To: FHWA980717A

Jeffrey A. Lindley
Division Administrator
California Division
Federal Highway Administration
980 Ninth Street, Suite 400
Sacramento CA 95814-2724

Re: 04-SF-ALA-80; Bay Bridge East Span Seismic Safety Project

Dear Mr. Lindley:

By letter of August 6, 1998, FHWA has asked for my concurrence in its determination that the undertaking cited above will adversely affect historic properties.

I concur in this determination and recommend that FHWA consult with all appropriate parties to seek ways in which the undertaking's effects on historic properties may be avoided or reduced.

Please refer any questions you may have regarding this matter to Hans Kreutzberg.

Sincerely,

H Kreutzberg for

Daniel Abeyta
Acting State Historic Preservation Officer

STATE OF CALIFORNIA—BUSINESS, TRANS. RTATION AND HOUSING AGENCY PETE WILSON, *Governor*

DEPARTMENT OF TRANSPORTATION, District 4
Box 23660
Oakland, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

September 30, 1998

4-SF/Ala-80

Ms. Diane Tannenwald
Department of Public Works
City of Oakland
250 Frank Ogawa Plaza, Suite 4314
Oakland, CA 94612

Dear Ms. Tannenwald:

SAN FRANCISCO - OAKLAND BAY BRIDGE EAST SPANS SEISMIC SAFETY PROJECT

As requested, the following is a list of systems that may be installed on the new east span structures:

- Traffic Operation System (changeable message sign, closed circuit TV, detectors, fiber optic cables)
- Call box System
- Supervisory control and data acquisition system
- Navigation aids - pier lights, navigation lights and beacons
- Fog detection system - fog detectors, fog horns, fog sirens
- Alarm systems
- Aviation lighting
- Radar beacon system
- Cathotic protection
- Strong motion detection system
- Medium voltage power distribution system (12kv)
- Substations (switchgears, transformers, circuit breakers)
- Backup power (diesel generators, battery banks)
- Architectural lighting
- Sign lighting
- Utility outlet stations
- Box girder and pier lighting

- Grounding system
- Air compressors and water pumps
- Other non-state facilities (i.e. PacBell fiber optic line, US Navy water line, etc.)

Please contact Katja Greve, Senior Transportation Engineer, at 286-44766 if you have any questions.

Sincerely

HARRY Y. YAHATA
District Director

By Steven Hulsebus

STEVEN HULSEBUS
Assistant Project Manager
Toll Bridge Program

cc: Mr. Ken Jong
C/E Consultant Team Manager
Parsons Brinckerhoff
303 Second Street, Suite 700 North
San Francisco, CA 94107-1317

Mr. A. Ely
T.Y. Lin
825 Battery Street
San Francisco, CA 94111

b. j-in 13103K 353.01

STATE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, *Governor*

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA. 94623-0660
(510) 286-4444

October 23, 1998

Ms. Victoria Eisen
Bay Bridge Pedestrian/Bicycle Advisory Committee
ABAG
P. O. Box 2050
Oakland, CA 94604

04251-012000
SF/Ala 80
SFOBB East Span Seismic Safety

Dear Ms. Eisen:

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Attached for your information and use are Caltrans responses to issues that were raised during the August 19, 1998 Bay Bridge Bicycle/Pedestrian Advisory Committee meeting for the new east span. In general our responses are categorized in three levels. A "yes" means Caltrans plans to implement it, a "no" means we are not in favor of implementing it, and a "maybe" or "pending" means we are considering it.

If you have any questions, please contact me at (510) 286-5085 (e-mail address shulsebu@ dot.ca.gov) or Pochana Chongchaikit at (510) 286-5057 (e-mail address pchongch@ dot.ca.gov).

Sincerely,

HARRY Y. YAHATA
DISTRICT DIRECTOR

by Steven Hulsebus

STEVEN L. HULSEBUS
Office Chief
SFOBB East Span

Attachment
CC: SHeminger
SMcAdam

San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Pedestrian/Bicycle Path Interest Group Meeting No. 6
August 19, 1998 – 10:30 a.m.

Discussion of Outstanding East Span Pathway Design Elements

I. Separation between users

		Remarks
A center line stripe for the bicycle lane and another stripe to separate the pedestrian and bicycle lane	YES	Some form of delineation will be necessary.
Directional signs in both English and Spanish	NO	
More intensive separations should be implemented at the ends of the span rather than throughout the entire span	NO	Bike/ped path should have a continuous design to reduce confusion of who should be where.
A 10-foot bike way.	YES	Use 10', 6", 5'
One center stripe between the lanes with directional signs, then reevaluate the separation after the first year and restructure as necessary.	NO	No restructure. See comment above.
A textured area between the two lanes, like a rumble strip which could be made of " rainline" (something used in roadway rumble strips)	Maybe	CT not opposing in concept

II. Pavement color and/or texture

A different pavement color for each side	Maybe	Different color per user
A rubberized texture for the pedestrian lane, perhaps ground up tires	NO	CT has maintenance concerns, not in favor
Pavement legends	YES	Standard bike symbols can be used
Shoe prints to illustrate walking on pedestrian lane	NO	Do not feel this is necessary
Signs with uncommon type styles to catch users' attention	NO	Follow Manual on Uniform Traffic Control Devices (MUTCD)
Color can be applied by separate mixes of concrete also by a top coat of color	Maybe	Further investigation to be done.

III. Handrail design

Waist-level rail with non-abrupt endings between the pedestrian lane and bicycle lane that does not run across the entire span, but only at turn-around points and high traffic areas.	NO	Rails at spot locations would become obstructions
Use directional fins for the railings – like the railings used on some highways	NO	Railings being designed by architect. Will need to follow safety requirements.
Only one horizontal element on the railings	Maybe	Railings being designed by architect. Will need to follow safety requirements.

Set back the vertical members, so that the railing curves out and up to waist level.	Maybe	Railings being designed by architect. Will need to follow safety requirements.
32" of solid barrier between path and roadway and above that, the rail	YES	Standard height safety rail will be used. Total height of barrier and rail should be 1.4 meters.
A smooth, rounded rail	Maybe	Design aesthetic must meet safety requirements
Barrier should be permeable to allow emergency vehicles access to the path from the roadway shoulder	NO	Barrier will be solid . Openings in railings on top of the barrier are subject to evaluation
Prevent the possibility of people falling off the bridge, especially small children	YES	
Need to minimize vertical sections on the railing because bike tires can get caught.	Maybe	Railings being designed by architect. Will need to follow safety requirements.

No rail between bike portion and ped portion of the path.
Barriers adjacent to automobiles must be standard barrier.

IV. Lighting

Light maintenance should be accessible from roadway shoulder to prevent maintenance vehicles and equipment from blocking path.	NO	Behind the barrier is the best location for workers. The path is 15.5' wide, there should be ample room
Shrouded, overhead lights need to be bright enough to light users and path.	YES	Adequate lighting will be provided

Other lighting details, such as light bar embedded in the barrier and headlight glare are still being evaluated.

V. Benches and other amenities

Belvederes for the benches so they do not interfere with the width of the path	NO*	* Belvederes subject to budgetary and structural constraints
More benches at the ends of the bridge and at intervals along the span.	NO	Benches won't fit without belvederes.
The benches should not allow users' feet to extend into the path area	NO	See comment above.
Drinking fountains and phones at each end of the bridge	NO	
Access to call boxes from the path and the roadway	YES	
Electric charging outlets for electric wheel chair users to recharge their chairs	NO	Liability issue

VI. Other User Safety

Impose a speed limit for cyclists	YES	
Impose a speed limit if it is necessary after a one-year evaluation	NO	Do it from the start
No speed limit	NO	
Signs posted with information about the best bicycle tire for the pedestrian/bicycle surface	NO	

VII. Gateway Park

Bike lane to terminate at the shore of the Touchdown rather than in the middle of the park or at the east end.	NO	Path attached to the bridge, bridge ends in the middle of the proposed park.
A separate structural entrance for pedestrian and cyclists	NO	All users to enter at the same place.

Other Issues

Treat the pavement of the roadway to prevent loud highway noise	NO	Surface treatment to reduce noise has a short life cycle. This means high maintenance cost and lane or possible bridge closure when reapplication is required.
Reconsider putting the path above the span, in between the eastbound and westbound traffic or make path wider	NO	Decision already made by MTC
An asphalt overlay over the concrete to minimize noise.	NO	Maintenance concern - conceal deck
Cover expansion joints to minimize impact on bicycles and wheelchairs	Pending	To be studied further
Noise barriers for the benches	NO	
A moving sidewalk or other moving apparatus should be considered	NO	
Windscreen to protect users against wind - created by motor traffic	NO	
Slope path toward the water	YES	

: CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

RTMENT OF TRANSPORTATION
60
D, CA 94623-0660
286-4454

December 1, 1998

Alan Eliot
MTC – Metrocenter
P.O. Box 2050
Oakland, CA 94604

SAMPLE

Dear Mr. Eliot:

Caltrans invites you to participate in a meeting focused on historic resource mitigation measures for the San Francisco–Oakland Bay Bridge East Span Seismic Safety Project. A number of Bay Area historic preservation organizations have been invited to attend, to provide input about possible mitigation measures related to project effects on the historic bridge, the Torpedo Building and Officers' Quarters on Yerba Buena Island, and the Key Pier Substation in Oakland.

The meeting will be held Thursday, December 10, 1998, from 4:00 p.m. to 6:00 p.m., in the Mountain View Conference Room on the 15th floor of Caltrans' District 4 Office, 111 Grand Avenue. You will need to check in and obtain a visitor's pass at the security desk in the building lobby.

If you have any questions, please contact me at (510) 286–6203 or call Andrew Hope at (510) 286–5601. We look forward to your participation in this meeting.

Sincerely,

HARRY Y. YAHATA
District Director

by

Jared Goldfine

JARED D. GOLDFINE, AICP
District Branch Chief
Office of Environmental Planning, South

Public Meeting on Bay Bridge Mitigation
Organizations and Individuals

1. American Society of Civil Engineers, San Francisco Section
   (Elizabeth Bialek, Newsletter – History Editor)
2. Art Deco Society of California (Michael Crowe, President)
3. California Preservation Foundation (Jeff Eichenfeld, Executive Director)
4. Foundation for San Francisco's Architectural Heritage
   (David Bahlman, Executive Director)
5. National Trust for Historic Preservation, Western Regional Office
   (Elizabeth Goldstein, Director)
6. Oakland Cultural Heritage Survey (Gary Knecht, Coordinator)
7. Oakland Heritage Alliance (Bill Coburn, Director)
8. Oakland Landmarks Preservation Advisory Board (George Lythcott, Chair)
9. San Francisco Landmarks Preservation Advisory Board (Daniel Reidy, President)
10. Society of Architectural Historians, Northern California Chapter
    (Michael Crowe, Preservation Officer)
11. Society for Industrial Archaeology, Samuel Knight Chapter
    (Andy Fahrenwald, President)
12. Mayor's Treasure Island Project Office (Annemarie Conroy)
13. Department of the Navy (Kenn Parsons)
14. Steve Mikesell – JRP Historical Consulting Services
15. John Snyder – Caltrans (retired annuitant)

METROPOLITAN TRANSPORTATION COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
Tel.: 510.464.7700
TTY/TDD: 510.464.7769
Fax: 510.464.7848
e-mail: info@mtc.ca.gov
Web site: www.mtc.ca.gov

December 16, 1998

RECEIVED
DEC 19 1998
DIRECTOR'S OFFICE

The Honorable Willie L. Brown, Jr.
Mayor, City and County of San Francisco
401 Van Ness Avenue
San Francisco, CA 94102

Dear Mayor Brown,

Thank you for your letter of December 7, 1998 regarding the passage of four local advisory measures regarding passenger rail service on the San Francisco-Oakland Bay Bridge.

As you know, MTC's design review process for the new eastern span of the Bay Bridge has been governed by the terms of Senate Bill 60 (codified as Section 188.5 and Section 31000 et seq of the Streets and Highways Code), which was signed into law by the governor in August 1997. These provisions were subsequently amended by Assembly Bill 2038, which the governor signed in June 1998. The law establishes a number of parameters for the new eastern span design that are relevant to your request regarding passenger rail service:

- The roadway in each direction will consist of five traffic lanes each 12 feet wide, with two shoulders each 10 feet wide for each direction;
- The cost of the new bridge is defined in statute ($1.285 billion) and is paid for through a combination of state funds and a $1 toll surcharge on Bay Area bridges which the legislation enacts; and
- MTC can extend the toll surcharge to pay for four design "amenities": a cable-supported main span, relocation or replacement of the Transbay Terminal, bicycle/pedestrian access on the new east span, and bicycle/pedestrian access on the existing west span.

In other words, the law distinguishes this seismic safety project from a typical transportation improvement project in two significant respects. First, the new eastern span must have the same capacity of traffic lanes as the existing bridge. Second, passenger rail service is not included as an eligible design "amenity" on the new bridge.

The language of the four advisory measures ("reduce regional traffic congestion, promote regional mass transit use") and your letter's request that "the current design work for the bridge should cease" are inconsistent with the statutory mandate for a seismic safety replacement project described above. The current design work on the new eastern span is approximately 50% complete and has cost the taxpayers $40 million. To start anew with a substitute design would entail considerable cost and delay. Moreover, including rail service on the bridge and its accompanying approach structures in San Francisco and the East Bay would require substantial new funding and additional legislative action as well. All of this would take time and cost money.

cc: Yahata JVE
Coleman
Hendrix
Hein

We believe we are compelled by state law to continue to press forward with the current design in order to reduce the risk that a major earthquake will destroy the existing east span before a replacement can be built. Within the limits of state law, the new eastern span is being designed to accommodate passenger rail service at some future date by strengthening certain supporting deck elements beneath the shoulders, or breakdown lanes, on the new span. Thus, the new span will have both the strength and the space to accommodate future rail service without taking any traffic lanes out of service. Therefore, the constraint on initiating rail service across the Bay Bridge will not be the design of the new eastern span, but rather the financial and engineering challenges of accommodating such service on the existing western span, in downtown San Francisco, and in Oakland and conceivably other East Bay communities.

In parallel with the current design process for the new eastern span, and to be responsive to your request for a study of passenger rail options in the Bay Bridge corridor, we propose to conduct an analysis of the following three options:

1. Improve existing services -- As you know, the Bay Bridge corridor already is served by multiple transit providers including BART, AC Transit, and the Alameda and Vallejo ferries. We believe that the first option to examine should be improvements to these existing services that can be implemented within the next few years.

2. On bridge rail service -- As noted above, the major challenges to instituting rail service on the Bay Bridge are the physical and engineering constraints of the Yerba Buena Island tunnel, existing western span, and the approaches at either shore. These constraints are worthy of serious examination.

3. Separate rail guideway -- A clear alternative to the daunting engineering challenge of including rail service on the Bay Bridge itself would be a separate rail bridge or tube in the same vicinity. Such an alternative was examined in MTC's 1991 Bay Crossing Study, and we would propose to update and enlarge upon that analysis as appropriate.

We look forward to discussing these and any other relevant study options with you and your staff at your convenience. At the same time, however, we must keep the new eastern span seismic safety project on schedule for completion at the earliest possible date.

Sincerely,

James P. Spering
Chair

cc: James W. van Loben Sels, Caltrans

The Honorable Willie L. Brown, Jr.
Mayor, City and County of San Francisco
401 Van Ness Avenue
San Francisco, CA 94102

The Honorable Elihu M. Harris
Mayor, City of Oakland
No. 1 City Hall Plaza
Oakland, CA 94612

The Honorable Jerry Brown
Mayor-Elect, City of Oakland
No. 1 City Hall Plaza
Oakland, CA 94612

The Honorable Ken Bukowski
Mayor, City of Emeryville
2200 Powell Street, 12th Floor
Emeryville, CA 94608

The Honorable Shirley Dean
Mayor, City of Berkeley
2180 Milvia Street
Berkeley, CA 94704-1308

DEPARTMENT OF TRANSPORTATION
OFFICE OF THE DIRECTOR
1120 N STREET
P.O. BOX 942873
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FAX (916) 654-6608

December 28, 1998

Mayor Shirley Dean
City of Berkeley
2180 Milvia Street
Berkeley, CA 94704

Mayor Elihu M. Harris
City of Oakland
One City Hall Plaza
Oakland, CA 94612

Mayor Ken Bukowski
City of Emeryville
2200 Powell Street
12th Floor
Emeryville, CA 94608

Mayor Willie L. Brown, Jr.
City of San Francisco
401 Van Ness Avenue
Room 336
San Francisco, CA 94102

Mayor-Elect Jerry Brown
City of Oakland
One City Hall Plaza
Oakland, CA 94612

Dear Mayors and Mayor-Elect:

Thank you for your letter of December 7, 1998, regarding the passage of four local advisory measures regarding passenger rail service on the San Francisco-Oakland Bay Bridge.

The Draft Environmental Impact Statement (EIS) for the San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project was released to the public on September 24, 1998. The comment period for this Draft EIS closed on November 23, 1998. The purpose of this project is to address the serious seismic deficiencies of the existing structure. Adding trains to the SFOBB is beyond the scope of this seismic safety project. An array of reasonable alternatives which address the purpose and need of the East Span Seismic Safety Project was included and analyzed in the Draft EIS; placing trains on the bridge was not part of this array.

Under existing state and federal law, transportation projects are developed consistent with a Regional Transportation Plan (RTP). Under federal law, this RTP must be a fiscally constrained planning document developed by the Metropolitan Planning

Organization (MPO). The Metropolitan Transportation Commission (MTC), the MPO for the Bay Area, has an adopted RTP consistent with federal law. This RTP has a twenty year planning horizon and includes transit enhancements in the Transbay Corridor. The East Span Seismic Safety Project is consistent with MTC's RTP. The ballot measures in your four cities did not modify or amend MTC's RTP.

Senate Bill 60 which was signed into law on August 20, 1997, outlined the funding for the East Span Seismic Safety Project. Senate Bill 60 added section 30604.5 to the Streets and Highways Code which states: "Notwithstanding any other provision of law, local and state permitting authorities shall not impose any requirement that a . . . mass transit facility be constructed on the San Francisco-Oakland Bay Bridge as a condition for issuing any permit, granting any easement, or granting any other form of approval needed for the construction of a new bridge." This is a clear statement of legislative intent that the project is not a mass transit or rail project and that it focus on seismic safety. The ballot measures in your four cities did not modify or amend existing State law.

Senate Bill 60 also implemented a carefully crafted funding package for the seismic retrofit of all toll bridges in the State of California, including the SFOBB. Reaching a legislative consensus on this funding package was a time-consuming and difficult process. This funding package did not provide for consideration of rail on the SFOBB, and therefore, the State Legislature would have to reconsider its funding decision before anyone could consider incorporating rail into the SFOBB East Span Seismic Safety Project. Given the significant cost associated with rail, undoing the existing consensus would at best significantly delay the current seismic safety project.

Your letter references the interim seismic retrofit of the eastern spans of the SFOBB. It is imperative to clarify the purpose of this project. The purpose of the interim seismic retrofit of the east spans of the SFOBB is to prevent multi-span collapse with the resulting catastrophic loss of life that will result from a moderate, more probable earthquake. The interim seismic retrofit does not provide protection from a large earthquake; that is the purpose of the East Span Seismic Safety Project. After the interim seismic retrofit of the east spans is complete, a maximum credible earthquake will still result in a multi-span collapse of the SFOBB. Therefore, the interim retrofit does not provide sufficient performance to justify postponing the East Span Seismic Safety Project. Delaying the SFOBB East Span Seismic Safety Project would jeopardize public safety. It will risk lives. Therefore we can not delay the East Span Seismic Safety Project.

As part of the planning process for the SFOBB East Span Seismic Safety Project MTC has recommended to the Department of Transportation (Caltrans) its locally desired option. Caltrans and FHWA are the legal decision makers for this project and are fulfilling this role. Due to the pressing public safety risk associated with the existing SFOBB, Caltrans is embarked upon risk design for MTC's locally recommended alternative. Caltrans acknowledges that this risk design may be discarded with the NEPA decision. However, it is

prudent to risk the cost of preparing this design, since it can potentially provide public safety at a much earlier date. This risk design provides flexibility, so future decision makers could easily modify the structure to add light rail. This flexibility is being accomplished by selectively strengthening supporting bridge sections beneath the shoulders of the new bridge. Decision-makers in the future then will have the option of deciding how best to use the space on the new bridge to address the region's transportation challenges.

We believe that it would be prudent to investigate rail options in the Transbay Corridor–separate from the SFOBB East Span Seismic Safety Project. We support the points made in the Metropolitan Transportation Commission's (MTC) letter to you dated December 16, 1998, concerning options to be studied. We wish to work with MTC and the Bay Area community to conduct an analysis of these options.

In the interest of public safety, we will keep the SFOBB East Span Seismic Safety Project on schedule for completion at the earliest possible date. We look forward to working with the Bay Area to complete a rail planning study to facilitate future projects and future decisions.

Sincerely,

JAMES W. VAN LOBEN SELS
Director

bc: Director's Office File
Legal's Office File

WMM:skr/SFOBB

C: HYY, HPH, DREYNOLDS, SHEMINGER, BRIAN, MARA, SHULSEBUS, RFALSETTI, ADE, CADAMS, J. TAPPING, D. OKUPA, BCOLEMAN, TANZIANO, AHENDRIX, BRIAN SMITH

CALTRANS SEISMIC ADVISORY BOARD

December 30, 1998

The Honorable Barbara Boxer
U.S. Senate
1700 Montgomery Street, Suite 240
San Francisco, CA 94111

RE: Seismic Safety of the San Francisco-Oakland Bay Bridge

Dear Senator Boxer:

As members of the Caltrans Seismic Advisory Board (SAB), we would like to direct your attention to a serious and important life safety issue concerning delays in the planning, design, and construction of the new east bay spans of the San Francisco-Oakland Bay Bridge (SFOBB) and we respectfully request your assistance. Since the devastating 1989 Loma Prieta earthquake, the California Department of Transportation (Caltrans) has been working with academia and the private sector to develop an engineering strategy on how to protect the Bay Bridge when the next major earthquake strikes. Thanks to that cooperation, great strides have been made in expanding knowledge and technology applicable to the seismic design of such bridges.

The eight-member SAB was constituted by the State of California following the 1989 Loma Prieta earthquake to review and advise Caltrans on seismic safety and policy issues. It was formed as a direct result of the Governor's Board of Inquiry following the 1989 Loma Prieta earthquake and recommendations made by that board in its report "Competing Against Time" enclosed herewith. The members of SAB consist of specialists in seismology, geotechnical engineering, and structural engineering from the practicing earthquake engineering community and academia. The SAB has closely followed and advised Caltrans since the Loma Prieta earthquake on important seismic safety related policy and procedural issues.

In a presentation to the SAB on December 15, 1989 on the status of the new east bay spans of the SFOBB, we were advised about project delays caused by the US Navy refusing to grant permission for soil explorations on and near the tip of Yerba Buena Island which are on the critical path for design completion of the new bridge.

The proposed soil explorations have no impact on any existing structures or facilities. The drilling is critical, however, in providing the technical data needed for the design and construction of a replacement structure along the identified northern alignment.

This northern alignment was arrived at after over three years of project studies by Caltrans and a detailed review by the 35 member Engineering Design Advisory Panel (EDAP) for the Metropolitan Transportation Commission (MTC). MTC, which is the transportation planning organization for the San Francisco Bay Area, has recommended this northern alignment as the best alternative.

The Seismic Advisory Board is very concerned with any delays, short or long, on such an important project to the citizens and economy of California. Such impediments undoubtedly will jeopardize public safety.

We, the members of the Seismic Advisory Board, remain committed to keeping this critical public safety project on track. Therefor, any assistance you can provide toward obtaining the Navy's permission to proceed with the needed soil explorations would be greatly appreciated.

Sincerely yours,

Bruce A. Bolt, Professor Emeritus
University of California, Berkeley

Joseph Nicoletti, Structural Engineer
URS Consultants, San Francisco

John F. Hall, Professor
California Institute of Technology

I.M. Idriss, Professor
University of California, Davis

Alexander C. Scordelis, Professor Emeritus
University of California, Berkeley

Frieder Seible, Professor
University of California, San Diego

F. Robert Preece, President
Preece, Goudie & Issa, San Francisco

Joseph Penzien, Chair SAB
Professor Emeritus
University of California, Berkeley

Enclosure Competing Against Time

C: William Cassidy, Jr., U.S. Navy
Kenn Parsons, U.S. Navy
James Van Loben Sels, Caltrans
James E. Roberts, Caltrans
Brian H. Maroney, Caltrans
Thomas J. Post, Caltrans
Dennis Mulligan, Dist 4, Caltrans
Steve Heminger, MTC
Gray Davis, CA Governor-Elect

PARTMENT OF TRANSPORTATION
OX 23660
ND, CA 94623-0660
6-4444
10) 286-4454

January 20, 1999

SAMPLE

On December 10, Caltrans held a meeting focused on historic resource mitigation measures for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. You should have received minutes of this meeting under separate cover. Because of scheduling conflicts, representatives from San Francisco, the U.S. Navy, and several historic preservation groups were not able to attend, so we are holding a second meeting on the subject.

At the meeting, Caltrans will describe the historic resources affected by the project including the existing bridge, the Torpedo Building and the Officer's Quarters at Yerba Buena Island. You will be asked to provide input about possible mitigation measures related to these historic resources. In addition, a representative from the Advisory Council on Historic Resources will be able to join us. The Advisory Council representative also plans to meet with participants in the December 10 meeting to discuss their historic resource mitigation suggestions.

The meeting will be held Tuesday, February 2, 1999, from 1:00 p.m. to 3:00 p.m. at Caltrans' District 4 Office, 111 Grand Avenue, Oakland, in the Park View Conference Room on the 15th floor. You will need to check in and obtain a visitor's pass at the security desk in the building lobby.

If you have any questions, please contact me at 510/286-6203 or call Andrew Hope at 510/286-5601. We look forward to your participation in this effort.

Sincerely,

HARRY Y. YAHATA
District Director

by

Jared D. Goldfine

JARED D. GOLDFINE, AICP
District Branch Chief
Office of Environmental Planning, South

Attachment

Distribution List for Historic Resources Mitigation Meeting
January 15, 1999

Oakland Meeting
Gary Knecht, Oakland Cultural Heritage Society
George Lythcott, Oakland Landmarks Preservation Advisory Board
Bill Coburn, Oakland Heritage Alliance
Marina Carlson, City of Oakland
Betty Marvin, City of Oakland-CDA Planning
Helaine Kaplan Prentice, City of Oakland
Dianne Tannenwald, City of Oakland
Andy Fahrenwald, Society for Industrial Archaeology
Bill Strum, Oakland Library
Kate Nichol, Port of Oakland
Shawna Brekke-Read, Oakland Heritage Alliance

San Francisco Meeting
David Bahlman, Foundation for San Francisco's Architectural Heritage
Daniel Reidy, Landmarks Preservation Advisory Board
Jim Chapell, San Francisco Planning and Urban Research Association
Michael Crowe, Art Deco Society of California, Northern California Chapter, SAH
Susan Goldstein, San Francisco Main Library, San Francisco History Center
Annemarie Conroy, City and County of San Francisco, Mayors Treasure Island Project Office

Oakland and San Francisco Meetings
Steve Mikesell, JRP Historical Consulting Services
Jeff Eichenfeld, California Preservation Foundation
Elizabeth Goldstein, National Trust for Historic Preservation
Kenn Parsons, Dept of the Navy
MaryAnn Naber, Advisory Council on Historic Preservation, Washington D.C.
Kimball E. Koch, National Park Service
Mara Melandry, Caltrans
Marilee Mortenson, Caltrans
Jared Goldfine, Caltrans
Andy Hope, Caltrans
John Snyder, Caltrans
Gloria Scott, Caltrans

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404

P/SWR :DWC

Ms. Mara Melandry
CalTrans District 4
111 Grand Ave
Oakland, CA 94623-0660

Dear Ms. Melandry:

Thank you for the opportunity to comment on the draft Jan 1999 Biological Assessment, SF-Oakland East Span Seismic safety project. Generally speaking most of the issues NMFS are concerned with were adequately covered during the Jan 11th meeting, but here are some general comments.

Concerning dredging issues, in addition to your dredging mitigation plans and operations, the following points should be considered.:

1. In areas and basins greater than twenty (20) feet in depth, dredging may occur at any time provided that (a) the hydraulic dredge is operated so that the intake is at or below the surface of the material being removed, (b) the intake is raised a maximum of three feet above the bed for brief periods to purge or flush the intake system, and (c) at no time shall the dredge intake be operated at a level higher than 3 feet above the substrate.

2. For basins less than twenty (20) feet in depth, hydraulic dredging shall be restricted to June 1 through November 30.

Concerning blasting effects, as you know this was discussed in depth at the meeting. However, given that blasting will occur, it is possible that the blast effects could adversely effect steelhead and chinook salmon, which may be in the area during the blast window.

Section 6 of the BA should contain what ever information you have concerning the possible blast effects on fish. Items to consider are, expected shock wave pressures, and sound levels. I suspect that additional mitigation measures may be needed for the old span demolition blasting, once information is gathered from the new span blast. Additionally, the BA did not contain a statement or comment that states your conclusion as to: whether or not there will or will not be an adverse effect on steelhead/chinook. If you have any questions or comments about this letter please call me.

sincerely,

Dan Cheng
707-575-6077

TATE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
O BOX 23660
AKLAND, CA 94623-0660
286-4444
10) 286-4454

January 21, 1999

Ms. Diane Tannenwald
City of Oakland
250 Frank H. Ogawa Plaza
Oakland, California 94612

Dear Ms. Tannenwald:

Enclosed per your request is a table comparing the seismic performance of various projects to retrofit the San Francisco-Oakland Bay Bridge.

If you have any questions, please call Mike Whiteside at (916) 227-8600.

Sincerely,

HARRY Y. YAHATA
District Director

by

Mara Melandry

MARA MELANDRY
Environmental Manager, SFOBB
Toll Bridge Program

Enclosure

SFOBB Retrofit Project Performance Comparison

Project	Approximate Return Period of Design Event	Expected Damage from Design Event
Interim Retrofit	N/A*	Irreparable damage to collapse.
$910m Retrofit	1000 to 1500 years	Moderate to Major Damage. Slow speeds but partially operational for "necessary" traffic only.
East Spans Replacement	~1500 years	Minor to Moderate Damage. Slow speeds but operational within hours. Fully operational in months.
YBI Tunnel Retrofit	~1500 years	Minor Damage. Fully operational.
West Spans Retrofit	1000 to 2000 years	Minor to Moderate Damage. Emergency access at slow speeds within hours. Operational at slow speeds within days.
West Approach Replacement	1000 to 2000 years	Minor to Moderate Damage. Emergency access at slow speeds within hours. Operational at slow speeds within days.

Bridge Earthquake Damage Definitions

Category	Description	Operations
No Damage	No notable damage. Evidence of movement may be present.	No loss of operations
Minor Damage	Some visible signs of damage. Repairs could be made under non-emergency conditions except for deck joints	Some to no loss of operations
Moderate Damage	Visible and significant signs of damage. Repairs or stabilization likely to be completed under emergency contracts.	Some loss of operations
Major Damage	Life safety is threatened under service loads. Emergency repairs, stabilization, or replacement required.	Considerable to total loss of operations
Collapse	Superstructure is off supports or supports have failed	Total loss of operations

* "The goal of the interim retrofit of the existing bridge is to protect the traveling public during a smaller magnitude probable earthquake until traffic is transferred to the replacement bridge. A specific level earthquake ground motion was not applied in the interim retrofit effort. Rather, the most glaring vulnerabilities, as identified in the previously studied Safety Evaluation earthquake retrofit, will be eliminated. A push analysis was used to establish the threshold for the first failure, and each subsequent one, in vulnerable members, joints, and connections. One exception is that a scaled, non-linear time history analysis was performed on the complex cantilever truss. Demands from this analysis were compared to the capacities of truss members and joints to identify local vulnerabilities. Retrofit strategies were determined from the demand/capacity evaluation." (Project Scope Summary Report, 11/20/97.)

Congress of the United States

Washington, DC 20515

January 26, 1999

Jose Medina, Director
CalTRANS
1120 N Street, MS-49
Sacramento, California 95814

Dear Director Medina:

Congratulations on your appointment as Director of CalTRANS. We look forward to working with you on the transportation issues affecting our communities and the State of California.

Earlier this month, our offices were briefed by Dennis Mulligan from your office regarding the status of the proposed San Francisco-Oakland Bridge East Span Seismic Safety project. At that briefing, we discussed the alignment issue and steps that CalTRANS might take to encourage a timely consensus with the principal local governmental officials involved in this project, including the Mayors of San Francisco and Oakland. To achieve this consensus, careful and thorough consideration must be given to the redevelopment and land-use impact issues of the local communities, as well as to recommendations on both proposed alignments, including the modified southern alignment.

We strongly believe that only by achieving a local consensus will this project be able to move forward through the complexities and requirements of both the Base Realignment and Closure (BRAC) and National Environmental Policy Act (NEPA) processes. We urge you to initiate the necessary meetings to begin these discussions at the local level in order to reach agreement on this important project for the San Francisco Bay Area.

Thank you for considering our request. We believe this important step by CalTRANS, under your leadership, could result in agreement by all parties concerned.

We look forward to working with you on this project and to hearing from you about its progress in the near future.

Sincerely,

BARBARA BOXER, U.S. SENATOR

DIANNE FEINSTEIN, U.S. SENATOR

NANCY PELOSI, M.C.

GEORGE MILLER, M.C.

ELLEN TAUSCHER, M.C.

RTMENT OF TRANSPORTATION
60
A 94623-0660
...
96-4454

January 27, 1999

Mr. Kenn Parsons
U.S. Department of Navy
Base Conversion Manager
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, California 94066-5006

Dear Mr. Parsons :

Subject: Memorandum of Agreement-East Span Seismic Safety Project

Enclosed please find a copy of a Draft Memorandum of Agreement (MOA) prepared pursuant to Section 106 of the National Historic Preservation Act for the East Span Seismic Safety Project. The stipulations included in the Draft MOA address the effects to architectural resources and archaeological resources for all of the build alternatives considered in the DEIS. The signatories to the MOA will be the U.S. Navy, U.S. Coast Guard, Federal Highway Administration, Advisory Council on Historic Preservation and the California State Historic Preservation Officer. Caltrans will be a concurring party to the MOA.

We request your written comments on the Draft MOA by February 11, 1999. Should you desire a meeting on this matter, we would be pleased to meet with you at your convenience prior February 11.

If you have any questions, please call me at 510/286-5623, or Jared Goldfine, Senior Environmental Planner at 510/286-6203.

Sincerely ,

Harry Y. Yahata
District Director

By:

Robert Gross, Chief
Office of Environmental Planning South

cc: Annmarie Conroy, S.F. Treasure Island Project

U.S. Department of Transportation

United States Coast Guard

Commander
Maintenance & Logistics
Command Pacific

Coast Guard Island, Bldg 54D
Alameda, CA 94501-5100
Staff Symbol: se-1
Phone: (510) 437-3511
FAX: (510) 437-5753

16475
February 16, 1999

Mr. Robert F. Tally, Jr.
Chief, Technology Deployment
U. S. Department of Transportation
Federal Highway Administration
California Division
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

RE: DRAFT *MEMORANDUM OF AGREEMENT AMONG THE FEDERAL HIGHWAY ADMINISTRATION, THE DEPARTMENT OF THE NAVY, THE UNITED STATES COAST GUARD, THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, FOR THE BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT IN SAN FRANCISCO AND ALAMEDA COUNTIES,* Jan 22, 1999

Dear Mr. Tally:

As stated in the subject, draft MOA in paragraph two on page one, the Federal Highway Administration (FHWA) will be the lead federal agency for this undertaking except for responsibilities related to the Native American Graves Protection and Repatriation Act (NAGPRA). If Caltrans discovers native burials on Coast Guard controlled property, NAGPRA procedures must be followed. Although the Coast Guard, as the federal agency controlling the property, will be responsible for NAGPRA compliance, Caltrans will also have variety of responsibilities, both fiscal and regulatory. For this reason, the Coast Guard requests that Caltrans be a party and signatory to the MOA.

We request that Caltrans's NAGPRA responsibilities be set forth in the MOA. In the event of a discovery of native burials on Coast Guard property, those responsibilities would include: 1) a requirement for Caltrans to stop its activity and notify the Coast Guard of its discovery; 2) reasonable steps being taken by Caltrans to protect those items discovered; 3) Caltrans will assume responsibility for contractor delays caused by any discoveries of native burials; and 4) costs incurred by the Coast Guard, as a result of Caltrans project-related NAGPRA compliance, shall be reimbursed by the State of California. In any event, the Coast Guard will make these four requirements a condition of the license or permit giving Caltrans access to our property.

Incidentally, the potential NAGPRA issue was brought to the Coast Guard's attention after distribution of the DEIS, for which the Coast Guard submitted comments to Caltrans about many potential impacts of construction on its property

In part IV.H. of the subject MOA, it was stated that the Coast Guard will ensure that any human remains encountered will be "treated in a respectful manner". Although the Coast Guard can concur that treatment should be in a respectful manner, we assume that the Coast Guard will not be the entity that discovers the remains. It will be Caltrans and/or Caltrans' contractors who will discover the remains and will have to follow NAGPRA procedures as set forth above.

DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-5006

2/19
cc: DTM

IN REPLY REFER TO:

18 FEB 1999

Mr. Harry Yahata
District Director
State of California
Department of Transportation
Post Office Box 23660
Oakland, CA 94623-0660

Re: Memorandum of Agreement Concerning The Proposed San Francisco-Oakland Bay Bridge East Span Seismic Safety Project

Dear Mr. Yahata:

I am writing in response to your letter of January 27, 1999, forwarding a Draft Memorandum of Agreement (MOA) dated January 22, 1999, that addressed historic preservation issues arising out of your Department's proposal to proceed with a northern alignment of the proposed East Span of the San Francisco-Oakland Bay Bridge.

As you know, the Department of the Navy reviewed the Draft MOA, which assumes implementation of the northern alignment, and provided its response at the meeting you hosted on February 2, 1999. Navy is opposed to the northern alignment and thus believes that it is inappropriate to enter into the proposed MOA.

Navy opposes the northern alignment of the proposed East Span for the reasons set forth in Assistant Secretary Robert B. Pirie's letter to your Department dated November 23, 1998. The proposed northern alignment would have a devastating impact on the historic and natural resources on Yerba Buena Island and would deprive the City of San Francisco of the opportunity to redevelop the Island. Additionally, in light of the opposition to the northern alignment expressed by other affected parties, we believe that it is premature to discuss any mitigation that would be responsive to this proposal.

I request that you address any additional consultations regarding historic preservation issues to Mr. Kenn Parsons. He may be reached at (650) 244-3004.

Sincerely,

E. R. HUNTER
CAPTAIN, CEC, USN
COMMANDING OFFICER

Copy to:
Federal Highway Administration
Treasure Island Development Authority

Copies to
Cindy Adams (HQ ENVVO),
Mara, Jared
Goldfine, Maroney,
Hulsebus

OFFICE OF THE MAYOR
SAN FRANCISCO

TREASURE ISLAND PROJECT
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WILLIE LEWIS BROWN, JR.

February 21, 1999

BY FAX

Rear Admiral John L. Parker
Commander
U.S. Coast Guard
Maintenance & Logistics Command Pacific
Coast Guard Island
Alameda, CA 94501-5100

Dear Admiral Parker:

Thank you for taking the time to meet with us today. I appreciate your desire to work with the City of San Francisco and the Navy in mitigating impacts of the new eastern span of the Bay Bridge.

We understand that you prefer a Northern alignment as there is no permanent impact to your property. The S-1 alignment indeed has an impact on the Coast Guard Station. As proposed, the permanent structure would impact 1.6 acres of Coast Guard property and 2.0 acres of Navy (future San Francisco) property. The S-1 most directly impacts the tennis court on Coast Guard property. Other impacts may be from noise in the barracks area both during construction and after the replacement span has been built. The construction impacts are severe under either alignment.

This letter is written to offer our assistance, if a southern alignment is chosen, to work with the Navy to house Coast Guard personnel in units on Treasure Island so that the station continues to be operable. My discussion with Mr. Yahata (Caltrans) last week revealed that no plans for temporary housing have been made for your personnel.

In addition, if the Coast Guard were willing to accept a southern alignment, the City and Navy are prepared to offer property on Treasure Island for replacement of the impacted barracks on Treasure Island. As a mitigation measure, Caltrans would be expected to pay for the costs of construction of the barracks. We are confident that together we could work with Caltrans to resolve this issue.

We are hopeful that something can be worked out with the Coast Guard to facilitate a southern alignment. We realize that the tennis court is an important recreational facility for the Coast Guard personnel and we would be willing to make tennis facilities on Treasure Island available for your use.

We are also willing in every way to assist the Coast Guard in mitigating issues caused by construction of the Bridge on ingress and egress from the facility via Macalla Road.

Please understand that delay in the bridge construction is certain unless we can facilitate a southern alignment. The issues involving the historic structures will delay the construction for the unforeseeable future. Issues involving the enormous economic impact to the city will cause significant delay as well.

The northern alignment has unmitigable impacts to the civilian reuse of former NAVSTA Treasure Island.

The impacts to the Base Reuse Plan are devastating. The loss in land sale value is over $22 million. Plans for 288 multi-family housing units will be destroyed. The Nimitz House and the historic district will be adversely impacted and diminished in value. The Torpedo Assembly Building, also an historic structure, will be rendered obsolete and inaccessible. The fire station will be rendered inoperable. Plans for a conference center overlooking Clipper Cove will be damaged. Loss in revenues over 10 years exceed $30 million and $90 million over 30 years. Construction losses alone are over $10 million over the 5 year period. Permanent tax increment financing losses are over $2.4 million per year, precluding such bonding capacity necessary for rebuilding the failing infrastructure of former NAVSTA Treasure Island.

As this is a public safety issue, we are certain that a "shared" burden of the permanent impact of the southern alignment – 1.6 acres from Coast Guard and 2.0 acres from the Navy (City) is the most fair and appropriate course of action. Similarly, the S-1 alignment places the new structure an equal distance between the Nimitz House and the historic district on YBI and the Coast Guard barracks producing a "Solomon- like" solution to the competing issues faced by two federal agencies in evaluating the impacts of anchoring the new span on YBI.

I urge your cooperation in pursuing a modified southern alignment. It is the best means by which to facilitate a resolution to the Bridge issue and finalize a regional consensus amongst the property owners bearing the brunt of the impact of the replacement project. The modified S-1 as proposed by the City has minimal impact to the Port of Oakland's expansion potential. EBMUD has stated that they are willing to work with the S-1 alignment (see attached letter). We hope you share our desire to reach a regional consensus and pave the way for a replacement project where all impacted parties share some impact of the permanent structure. We believe the modified S-1 fits the bill.

I hope you agree and I look forward to working with you to resolve the alignment issue. The shared burden of the impact between the Navy (City) and the Coast Guard seems to be the fairest possible solution.

Sincerely,

ANNEMARIE CONROY
Executive Director

Cc: Mayor Willie L. Brown, Jr.
All TIDA Members
Secretary Cassidy
Secretary Slater
Senator Diane Feinstein
Senator Barbara Boxer
Nancy Pelosi, M.C.
George Miller, M.C.
Ellen Tauscher, M.C.

x c:BRIAN, SHULSEBUS, MARA

U.S. Department of Transportation
United States Coast Guard

Commander
Maintenance & Logistics
Command Pacific

Coast Guard Island, Bldg 52
Alameda, CA 94501-5100
Staff Symbol: (m)
Phone: (510) 437-3939
FAX: (510) 437-5799

11011
23 Feb 99

Ms. Annemarie Conroy
Executive Director, Treasure Island Project
410 Avenue of the Palms, Treasure Island
San Francisco, CA 94130

Dear Ms. Conroy:

I received the faxed copy of your follow up letter to our meeting of February 22 and your request that I take a position in support of a southern alignment for the new Oakland to Yerba Buena Island bridge span. I certainly understand your arguments about the impact of a northerly alignment on Base reuse plans for Treasure Island and Yerba Buena Island. The figures you quote in regards to such issues as annual operating revenues, tax collections and impact on land values are certainly significant. Further, I am most appreciative of the city's offer to find alternate locations for Coast Guard functions should the southerly alignment be chosen. You may be sure that I will take you up on the offer if the need arises.

I must say that I am concerned about your characterization of the Coast Guard interests as *"directly impacting a tennis court"* and *"impacts from noise in the barracks area ..... during construction"*. Any responsible engineer would agree that a construction project as large as that being contemplated by the State of California is inherently disruptive and dangerous. Clearly, the impact of construction activities will extend far beyond the footprint of the final bridge structure. Your description trivializes the Coast Guard interests and is inaccurate. As I believe you are aware, the position the Coast Guard has repeatedly taken in meetings both in San Francisco and Washington is that we intend to be a cooperative, team player. As an affected landowner, however, we have legitimate concerns about the impact the bridge's design and construction will have on our ability to operate from our Yerba Buena Island facility. Those concerns are the same regardless of the alignment or design chosen, and have been consistently expressed as follows:

- The need for Coast Guard employees, contractors and vendors to have uninterrupted, around the clock (24 x 7) access to our facilities.
- That provisions are included in the design to assure the safety of our people at all times during demolition and construction.
- That the design and construction plan makes provision to mitigate noise for barracks and housing area residents.
- That the design and construction plan provides for continued physical security of Coast Guard property.
- That all facilities on the Coast Guard reservation at Yerba Buena Island remain available for use or that either interim or permanent replacements are planned for.
- That pedestrian access is maintained to locations where public transportation is available.
- That the design and project plan allows for unrestricted movement of Coast Guard vessels to and from their moorings.

11011
23 Feb 99

- That design provisions are included which mitigate or correct hillside erosion, particularly during defoliation and blasting.

- That design and project plans prevent interference with and restrictions on the use of Coast Guard electronics and communication equipment.

- That the Coast Guard either bears no out of pocket costs as a result of the construction project or, that any costs borne are reimbursed.

Our earlier support of the northerly alignment was based upon a review of preliminary design documents which showed the least likelihood of adverse impacts on Coast Guard operations, and upon CALTRANS' stated willingness to work with the Coast Guard to mitigate adverse impacts. Regardless of the outcome of the debate now in progress, the conditions to grant a permit to utilize Coast Guard property will be contingent upon the answers we get to those matters outlined above.

While I recognize the legitimate and, in some cases, compelling interests of all parties interested in the bridge's construction, the Coast Guard (in its role as property owner) does not intend to take a public position in favor of, or against the preferences of the city of San Francisco, the Navy, the city of Oakland, the East Bay Municipal Utility District, CALTRANS or any other effected organization. As requested in earlier meetings, we recognize the Federal Highway Administration as the lead Federal agency in this process and intend to work with FHWA to develop either a Federal consensus or a U.S. Department of Transportation position if one is needed. Future commitments on behalf of the Coast Guard will require:

- An agreement between all parties on an acceptable alignment,

- A State of California design document in sufficient detail for us to determine exactly what the impacts on Coast Guard property may be and,

- A construction plan which describes how the issues above will be addressed.

It would be imprudent and premature to seek agreements with any of the interested parties or to alter our existing position until that information is available.

I frankly believe that State and local authorities can best facilitate the Coast Guard's support and, that they can best eliminate the possibility of construction delays by reaching consensus among themselves. I wish you the best of luck in doing so and I pledge my best efforts (in cooperation with other elements of the U.S. Department of Transportation) to help bring that result about.

Sincerely,

John L Parker

JOHN L. PARKER
Rear Admiral, U. S. Coast Guard
Commander, Maintenance & Logistics Command Pacific

Copy: FHWA Sacramento
CALTRANS
COMDT (G-CC),(G-S),(G-CRC),(G-SEC)
COMPACAREA (P)
USN, EFA West
CO, Group San Francisco

STATE OF CALIFORNIA GRAY DAVIS, Governor

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
THIRTY VAN NESS AVENUE, SUITE 2011
SAN FRANCISCO, CALIFORNIA 94102-6080
PHONE: (415) 557-3686

March 1, 1999

Annmarie Conroy, Executive Director
Mayor's Office Treasure Island Reuse Project
410 Avenue of the Palms
Building 1, Second Floor
Treasure Island
San Francisco, CA 94130

SUBJECT: Yerba Buena Island Reuse Plan

Dear Ms. Conroy:

I am following up on the brief discussion we had during the meeting of the Bay Bridge Design Task Force last Wednesday.

As you emphasized during your presentation to the Task Force, the principal reason for San Francisco's opposition to a northern alignment for a bridge structure to replace the eastern span of the San Francisco-Oakland Bay Bridge is that a bridge on the northern alignment would preclude a large residential project from being developed on Yerba Buena Island. As I mentioned, BCDC's *San Francisco Bay Plan* designates the entire Yerba Buena Island as a park priority use area. The Plan includes the following enforceable policy statement: "If and when not needed by Navy or Coast Guard, redevelop released areas for recreational use." This designation and policy have been in place for over 30 years and have been approved by the federal government pursuant to the provisions of the federal Coastal Zone Management Act (CZMA).

Under California law, BCDC's permit authority (i.e., the "coastal zone") extends inland only 100 feet from the Bay shoreline. However, under the CZMA, any federal agency activity—within or outside the coastal zone—that affects the coastal zone must be consistent to the maximum extent practicable with California's enforceable coastal policies. BCDC has determined that any federal activity that is inconsistent with one of the Bay Plan priority use designations affects the coastal zone and must comply with CZMA requirements. The transfer of federal property to a local government is a "federal activity" as that term is used in the CZMA; therefore, it will be necessary for the U.S. Navy to submit a "federal consistency determination" to BCDC before it can transfer Yerba Buena Island to the City and County of San Francisco.

In reviewing this determination, our Commission will consider how San Francisco plans to use the property. We would expect that the Commission would find limited commercial use of the historic buildings on Yerba Buena Island to be generally consistent with recreational use of the Island. This is similar to the approach that is being used at the Presidio of San Francisco. However, any large scale new residential development would probably be seen as incompatible with general recreational use of the Island.

San Francisco can request that BCDC delete the park priority use designation on Yerba Buena Island. Applicants for Bay Plan amendments must pay the cost of our processing of the amendment request. In determining whether or not to delete this designation, the Commission would

consider whether there is some compelling reason, from a regional perspective, to drop the designation. I expect that proponents of a northern alignment for the replacement bridge might oppose lifting the Bay Plan park designation on Yerba Buena Island.

I would be pleased to discuss this matter further with you and representatives of the U.S. Navy if you would find this helpful.

Sincerely,

WILL TRAVIS
Executive Director

cc: Commissioners and Alternates
Rear Admiral Ronne Froman, U.S. Navy
Honorable Mary King, Chair, Bay Bridge Design Task Force
José Medina, Director, Caltrans
Larry Dahms, Executive Director, MTC

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

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March 4, 1999

BY FAX DELIVERY

Mr. Will Travis
Executive Director
BCDC
30 Van Ness Avenue
Suite 2011
San Francisco, CA 94102

Dear Mr. Travis:

Thank you for your letter following up on a "brief discussion" on Wednesday, February 24th. I would hardly characterize the exchange as a discussion and would have expected you to raise certain issues in an appropriate and professional manner by contacting our offices prior to the 24th to discuss your alleged "concerns".

Your letter is most enlightening with regard to your advocacy for the N-6 alignment.

It is important to clarify some issues with regard to the applicability of the Bay Plan to future development on former Naval Station Treasure Island. Contrary to your quote in the Chronicle the other day, the City has carefully considered the effects of the Bay Plan on Yerba Buena and Treasure Islands. As you know, the City's Reuse Plan requires a 100-foot shoreline band around both islands. In addition, we are confident that uses of Yerba Buena

Island proposed in the Reuse Plan, including, for example, a bed and breakfast, conference center, cafes and other public, recreationally oriented uses, are consistent with the Bay Plan.

Our confidence in this conclusion was underscored by your letter of August 16, 1996, noting that (1) "...our staff believes the plan, and especially proposed shoreline public access and recreational opportunities, are fully consistent with the Commission's laws and policies," and (2) "We believe the Draft Reuse Plan is consistent with these policies because it denotes a perimeter public promenade around Treasure Island, including a small park...and considerable open space on Yerba Buena Island at the connection to the Treasure Island causeway...The City and County of San Francisco should be commended for its efforts in producing a Draft Reuse Plan that so closely conforms to the Commission's regional goals and policies." See Attachment A.

Please be assured that if we plan to include uses that are not consistent with the Bay Plan, we will seek appropriate amendments. We are confident that the resulting combined Treasure Island/Yerba Buena Island development will enhance recreational uses beyond those available today.

The City of San Francisco has proposed the modified S-1 alignment. This plan should be of significant interest to BCDC, given its mandate to protect the Bay, its shoreline areas and to administer the Bay Plan and to minimize fill of the Bay. The S-1 alignment has many environmental benefits that should be taken into consideration by BCDC prior to advocating the N-6 alignment which creates a number of issues under the Bay Plan which have been conveniently ignored.

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We trust that BCDC is exercising its guardianship of the Bay Plan with regard to Caltrans' Bay Bridge project as diligently as it has with Treasure Island. In considering the consistency of the various alignments with the Bay Plan, BCDC should be aware of the following:

1. The S-1 alignment provides significantly more recreational use opportunities on Yerba Buena Island than the proposed northern alignment. The N-6 alignment directly takes over six acres of Yerba Buena Island and indirectly impacts another 30 acres. By contrast, the S-1 alignment takes only 3.6 acres of property, of which 1.6 acres are in a federal enclave and thus not available for recreational use by Californians. Thus, the Bay Plan policy favoring recreational use of YBI that was the subject of your letter is better served by the S-1 alignment.

2. The northern alignment fills more of the Bay than the S-1 alignment. The S-1 alignment is shorter and more direct than the northern alignment and, thus, would create less Bay fill.

3. The S-1 alignment, in its East Bay touchdown, provides greater protection to sensitive habitat areas in tidal marsh and wetlands areas identified in the Bay Plan – the Emeryville Crescent Wildlife Area. The N-6 causes devastation to the conservation area on this northern "spit" of property placing pilings and footings throughout this sensitive area highlighted in the Bay Plan. The S-1 provides less damage and impact to this East Bay shoreline and provides for an opportunity to protect up to two times the shoreline than the N-6 provides.

4. The Bay Plan shows another East Bay area impacted by the S-1 – the Port of Oakland. This shoreline area, according to the Bay Plan, is slated for Port and other industrial uses. It appears your advocacy for the N-6 to protect a "park" on the spit is inconsistent with the Bay Plan. The S-1 alignment preserves the entire Port expansion area, unlike the S-4 alignment (considered by Caltrans in the DEIS and rejected in favor of the N-6) which would take 15 or more acres.

Since it appears that the S-1 alignment supported by the City of San Francisco is more consistent with the Bay Plan's priority policies than Caltrans' proposed northern alignment (including the policy favoring recreational use of Yerba Buena Island referenced in your letter), we find your unsolicited legal advice and your vocal advocacy for the northern alignment puzzling.

I would appreciate a copy of any resolution passed by your Commission outlining the reasons BCDC supports the N-6 alignment and the precise language allowing Commissioners to vest in the Executive Director the power to advocate for the N-6, a plan which ignores BCDC's own mandates and policies.

At a minimum, BCDC should compare the N-6 and the S-1 for consistency with the Bay Plan before invoking BCDC policy to criticize the S-1 alignment. In order that we may better understand BCDC's position on these matters, please provide me with whatever comparative analysis BCDC has done regarding the relative consistency of the N-6 and S-1 alignments to the Bay Plan.

I look forward to a fair and impartial response.

Sincerely,

Annemarie Conroy
Executive Director

CC: Governor Gray Davis
Mayor Willie L. Brown, Jr.
Mayor Jerry Brown
All MTC Commissioners
All EDAP Members
San Francisco Board of Supervisors
Secretary Slater
All BCDC Commissioners and Alternates
Secretary William Cassidy, USN
Admiral Froman, USN
Hon. Mary King
Jose Medina, CALTRANS
Larry Dahms, MTC

DEPARTMENT OF TRANSPORTATION
DISTRICT 4 - TOLL BRIDGE PROGRAM
111 Grand Avenue
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-4444
TDD (510) 286-4454

March 5, 1999

Mr. David Lewis, Executive Director
Save San Francisco Bay Association
1736 Franklin Street, Fourth Floor
Oakland, CA 94612

Dear Mr. Davis,

Thank you for your letter of January 27, 1999 in which you requested documentation of the information used to reach the conclusion favoring replacement over retrofit of the East Span of the San Francisco-Oakland Bay Bridge (SFOBB). Enclosed please find a copy of the report, "Replacement Study for the East Spans of the San Francisco-Oakland Bay Bridge Seismic Safety Project," Caltrans, 1996. This report, with its accompanying memoranda, is a decision document prepared in Caltrans' Office of Structure Design to address this issue.

Efforts to seismically retrofit the entire SFOBB have been in progress for over 10 years, starting immediately after the October, 1989 Loma Prieta Earthquake. During this time, scientific and engineering understanding of seismic demand and design has greatly expanded, and continues to expand. Numbers cited in any document must be viewed in this context. Also, numbers for designs that are still being developed cannot be considered final until the design is complete.

You stated that "an appropriate comparison of one project option to another should be based on designs which provide an equal degree of seismic stability." The designs for the various options to seismically retrofit the East Span of the SFOBB have developed at different times, not concurrently. Documentation for these options was based on structures either designed, under design or under study, and seismic performance was considered a design variable. For example, the retrofit design was completed some time ago while the design for the N-6 replacement alternative is currently at approximately the 45% design stage. As each design was developed, Caltrans evaluated the level of seismic performance while balancing many issues including cost, seismic reliability, and post-earthquake performance. Caltrans does not intend to redesign or restudy options already considered in order to bring them all to a fully equal level of seismic performance. Such an endeavor would be prohibitively expensive and cause significant delay to implementation of a seismic retrofit strategy for the East Span.

In addition, the retrofit design cannot practically be designed to perform in a seismic event in a manner that is equivalent to the performance of a new structure, and it will not have post-event serviceability equal to a new structure. A new structure can and will be designed to provide a "lifeline connection." Please refer to the Draft Environmental Impact Statement for clarification of the definition of "lifeline connection." A retrofitted structure was designed to

meet "no collapse" criteria (Caltrans' standard retrofit criteria). This means that the structure would not collapse during an event, but would have little residual strength, and be all but useless after a seismic event.

We are pleased that Save San Francisco Bay Association agrees that "determining the best option to prevent the failure of the Bay Bridge during a major seismic event is of paramount importance to the Bay Area." We would add that maintaining this key transportation facility in operational condition following a seismic event is also of paramount importance to the Bay Area. Caltrans' priority is to prevent loss of life and property during a major seismic event and to provide a transportation facility that will be ready for service during post-earthquake recovery.

If you have any questions about this matter, you may call Mike Whiteside at (916) 227-8600.

Sincerely,

HARRY Y. YAHATA
District Director

by

Mara Melandry

MARA MELANDRY
Environmental Manager, SFOBB

Enclosure

DEPARTMENT OF TRANSPORTATION
DISTRICT 4 - TOLL BRIDGE PROGRAM
111 Grand Avenue
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-4444
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March 10, 1999

Ms. Aliza Gallo, Interim Executive Director
Oakland Base Reuse Authority
317 Murmansk Street, Building 590
Oakland Army Base, California 94626-5612

Dear Ms. Gallo:

This letter is a follow-up to our telephone messages and conversations. Enclosed please find a copy of a letter from the United States Department of the Interior (DOI) to the Federal Highway Administration (FHWA) pertaining to the Draft Environmental Impact Statement for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. The East Span Seismic Safety Project would seismically retrofit or replace the East Span of the San Francisco-Oakland Bay Bridge. The letter from DOI refers to a proposed gateway park at the Oakland Touchdown. It states that the Oakland Base Reuse Authority (OBRA) has accepted a proposal by the East Bay Regional Park District (EBRPD) for designation of a 14.7-acre portion of the Oakland Army Base in the vicinity of the Oakland Touchdown for park use. DOI recommends that FHWA consult with OBRA regarding potential concerns about potential impacts to park and recreation resources from the East Span Seismic Safety Project. As FHWA's state partner in the East Span Seismic Safety Project, we are writing to ask OBRA for the following information to contribute to this consultation:

1. Any concerns that OBRA may have about potential impacts to park and recreation resources at the Oakland Touchdown as a result of alternatives for the East Span Seismic Safety Project.
2. The current status of EBRPD's proposal for park use at the Oakland Touchdown.
3. The current status of any designations that OBRA may have made related to reuse of the portion of the Oakland Army Base at the Oakland Touchdown for park or other uses.
4. The current schedule for circulation of a base reuse environmental document.

Thank you for your assistance in this matter. If you have any questions, you may call me at (510) 286-5582.

Sincerely,

HARRY Y. YAHATA
District Director

by

Mara Melandry

MARA MELANDRY
Environmental Manager

Enclosure
c: BWong (FHWA), TGalvin (DOD)

STATE OF CALIFORNIA GRAY DAVIS, Governor

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
THIRTY VAN NESS AVENUE, SUITE 2011
SAN FRANCISCO, CALIFORNIA 94102-6080
PHONE: (415) 557-3686

March 11, 1999

Annemarie Conroy
Executive Director
Treasure Island Project
410 Avenue of the Palms
Building 1, 2nd Floor
San Francisco, CA 94130

Dear Ms. Conroy:

In your March 4, 1999 letter you requested a copy of any resolution passed by our Commission outlining the reasons why BCDC supports a northern alignment for a bridge structure to replace the eastern span of the San Francisco-Oakland Bay Bridge. You also requested "the precise language allowing Commissioners to vest in the Executive Director the power to advocate for the N-6 [northern alignment], a plan which ignores BCDC's own mandates and policies."

Regarding your first request, the Commission does not typically adopt resolutions. Instead, BCDC often adopts staff recommendations, sometimes with revisions the Commission deems necessary. Such was the case when our staff made a recommendation on the replacement structure on June 18, 1998. I have enclosed the June 12, 1998 staff report which our Commission considered, the relevant section of the minutes for the June 18, 1998 BCDC meeting, and the June 19, 1998 letter transmitting BCDC's conclusions to the Bay Bridge Design Task Force.

Regarding your second request, the Commission has not authorized me to advocate for a northern alignment, and I have not done so. On June 18, 1998, the Commission endorsed the EDAP recommendations, which included a northern alignment, because the recommendations "adequately address, at this level of design, the issues BCDC will have to consider when Caltrans submits a permit application for the replacement bridge." I explained this at the February 24th Bay Bridge Task Force meeting when I stated that the northern alignment was not perfect and that other alignments could probably address the issues of concern to the Commission equally or perhaps even better than the one chosen. However, since the primary purpose of the bridge replacement project is to address a serious earthquake hazard problem as quickly a possible, I cautioned against exploring other alternatives if that would delay the completion of this critical public safety project.

I hope this information is helpful to you in understanding BCDC's position on the alignment of the replacement bridge.

As to San Francisco's plans for Yerba Buena Island, when we wrote the August 16, 1996 letter you referenced, our impression was that the residential development planned for Yerba Buena Island would be limited to redeveloping existing residential units and to limited low density new housing that would be part of visitor-serving and recreational facilities. Your March 4th letter also leaves me with that impression. I suspect that our Commission could find this type of limited residential development acceptable. Yet at the February 24th Task Force meeting, I understood you to say that the principal reason San Francisco opposes a northern alignment for a bridge structure is that it would preclude a large residential project from being developed on Yerba Buena Island. This seeming change in your reuse plan surprised me. I regret that you found it inappropriate and unprofessional for me to ask about this issue as soon as I became aware of it.

I also understand that after San Francisco prepared the reuse plan which we reviewed in 1996, the Urban Land Institute formulated recommendations for Yerba Buena Island and that ULI recommended against any large scale residential development on the island. To help us sort out these seeming contradictions, I would appreciate it if you would clarify the scale and type of residential development San Francisco is currently contemplating on Yerba Buena Island.

Sincerely,

WILL TRAVIS
Executive Director

cc: Commissioners and Alternates
Rear Admiral Ronne Froman, U.S. Navy
Denis Mulligan, Caltrans
Larry Dahms, MTC

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
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Agenda Item #12

June 12, 1998

TO: Commissioners and Alternates

FROM: Will Travis, Executive Director (415/557-8775 travis@bcdc.ca.gov)
Steven McAdam, Deputy Director, Chief of Regulatory Services
(415/557-8767 stevem@bcdc.ca.gov)

SUBJECT: **Staff Report and Recommendation on the Replacement of the Eastern Span of the San Francisco-Oakland Bay Bridge**
(For Commission consideration on June 18, 1998)

Summary and Recommendations

Over the past year, a Bay Bridge Design Task Force, created by the Metropolitan Transportation Commission (MTC), has been deliberating on the selection of the type of structure that should be used to replace the eastern span of the San Francisco-Oakland Bay Bridge as part of the seismic retrofit of the overall span. The Task Force is composed of seven members of MTC and includes Angelo Siracusa, BCDC's representative on MTC.

The Task Force is assisted by an Engineering and Design Advisory Panel (EDAP), which includes all of the members of BCDC's Design and Engineering Criteria Review Boards. On May 29, 1998, the EDAP recommended to the Task Force that the replacement structure should be a single-tower, self-anchored suspension bridge joined to the East Bay shoreline by a causeway, and that a bicycle and pedestrian path should be provided along the south side of the new bridge. The Task Force is scheduled to vote on EDAP's recommendations on June 22, 1998 and forward its recommendations to the full MTC for consideration on June 24, 1998.

The staff recommends that the Commission: (1) endorse the EDAP recommendations because they adequately address, at this level of design, the issues BCDC will have to consider when Caltrans submits a permit application for the replacement bridge; (2) direct BCDC's representative on the Task Force and MTC to support funding for a bicycle and pedestrian path on the replacement bridge; and (3) offer any other comments or suggestions the Commission finds necessary to assure that the Task Force, MTC and Caltrans will properly consider seismic safety, Bay fill, public access, rail transit, environmental impacts, or other issues which BCDC is mandated to address.

Background

At BCDC's July 17, 1997 meeting, the staff briefed the Commission on the status of the deliberations of the Bay Bridge Design Task Force and the principal issues of concern to BCDC. The Commission accepted the preliminary conclusions described

below, which were then incorporated into the Bay Bridge Design Task Force's recommendations to the Metropolitan Transportation Commission. Exhibit 1 is a summary of 17 finance, design and planning recommendations approved by the Task Force at its July 23, 1997 meeting. At MTC's July 30, 1997 public meeting, the MTC approved the Task Force's recommendations.

Since the Commission's last involvement in this project, Caltrans and its project consultant team of T.Y. Lin International, Moffat & Nichol, Fugro West, Earth Mechanics, Inc., Parsons Brinkerhoff, and other supporting consultants, have developed draft "30% bridge design and cost estimates." This information was presented to the EDAP at a series of meetings which resulted in the alternatives being narrowed to two alternative "signature" types—a single-tower, cable-stayed segment and a single-tower self-anchored suspension segment near the span's touch down at Yerba Buena Island. The remainder of the span would be an elevated causeway, or "skyway," in both alternatives (see the attached Executive Summary of the consultants' report).

At its meetings on April 15, 1998 and May 29, 1998, the EDAP approved the following four recommendations for consideration by the Bay Bridge Design Task Force:

1. The new eastern span should be a single-tower self-anchored suspension bridge.
2. The causeway section of the new eastern span should be constructed of either concrete with a variable depth profile or steel with a constant depth profile, with a minimum span length of 525 feet, except at the Yerba Buena Island transition and Oakland touchdown.
3. The new eastern span should have a single bicycle/pedestrian path on the south side of the eastbound deck, with a width and height (in relation to the deck) adequate to ensure the safety and comfort of path users and protect the views of motorists.
4. The pile caps for the piers supporting the causeway section should be placed above water, but with careful attention to the design.

BCDC Policy Issues

Listed below are the principal policy issues of concern to BCDC, the Commission's preliminary conclusions, and brief discussions explaining how the Task Force and the MTC incorporated the Commission's conclusions into their recommendations.

Seismic Safety. Section 66605 (d) of the McAteer-Petris Act requires the Commission to find that any fill project that it approves will be "constructed in accordance with sound safety standards which will afford reasonable protection to persons and property against the hazards of unstable geologic or soil conditions."

According to Caltrans, replacing the span offers an opportunity to significantly improve the seismic reliability and greatly increase the useful life of the eastern span of the Bay Bridge. MTC concurred that "a new eastern span will be seismically stronger, less costly to maintain, less disruptive to construct, and potentially more protective of the environment than the retrofit of the existing bridge." Therefore, the EDAP and Bay Bridge Design Task Force recommended replacing the span to "post-earthquake lifeline service" which means that the new bridge will be usable after an earthquake. BCDC preliminarily concurred in this recommendation.

The principle recommendation of the EDAP involves the selection of a single-tower self-anchored suspension bridge as the signature element of the new span. This recommendation is overwhelmingly supported by the members of BCDC's Design and Engineering Criteria Review Boards who serve on the EDAP. It appeared to the EDAP that all four of the alternative designs which were considered would provide post-earthquake lifeline service. Therefore, it appears that Caltrans will be able to design a structure that will meet the requirements of Section 66605(d) of the McAteer-Petris Act, whichever of the four alternative designs is selected.

The single-tower alternatives presented to the EDAP would have better seismic performance than would the double-portal designs. An asymmetrical suspension bridge has design advantages because the tower of the bridge can be placed closer to the bedrock underlying Yerba Buena Island. Therefore, the staff believes EDAP's final recommendations adequately address BCDC concerns about seismic safety.

Bay Fill. Section 66605 (c) of the McAteer-Petris Act requires the Commission to make a finding that "the water area authorized to be filled" by any project approved by BCDC is "the minimum necessary to achieve the purpose of the fill."

The existing Bay Bridge contains two roadways in a double deck structure with westbound traffic on the top deck and eastbound traffic on the lower deck. This configuration is not as seismically reliable as two parallel roadbeds would be. Moreover, a parallel roadbed configuration would give the bridge a more slender visual profile and would provide eastbound motorists with sweeping views of Oakland, Berkeley and the East Bay hills. Although a replacement structure with parallel roadways would double the amount of the Bay covered by the bridge, the bulk of this coverage would be high above the Bay and cause limited environmental impacts. On balance, it appears that the seismic and visual benefits of a single-deck roadway outweigh the limited environmental benefits of a double-deck roadway. Also, the EDAP concluded that a single deck configuration would be seismically more reliable than a double deck configuration. Therefore, the Commission preliminarily found that is would be better for the replacement span to contain two parallel roadways than to replicate the current double-deck configuration. The Bay Bridge Design Task Force and MTC endorsed EDAP's position and recommended a single deck configuration.

In addition, a number of alignments for a replacement span were evaluated. They ranged from a far northern alignment which would be built in a sweeping curve to a southern alignment which would be built in a nearly straight line immediately south of the existing bridge. Generally, the more northern the alignment, the

better the views for motorists, the longer the bridge, the more troublesome the underlying geological conditions, and the more fill involved. As a result, the range of options was narrowed to a near northern alignment and a southern alignment. A southern alignment would have the potential of reducing the amount of space available for future port development at the Port of Oakland south of the Bay Bridge toll plaza. This area is reserved as a port priority use area in the *San Francisco Bay Plan* and the *San Francisco Bay Area Seaport Plan* to minimize the need to fill the Bay for future port development. Therefore, the Commission preliminarily found that a near northern alignment for the replacement span would be preferable because a southern alignment could lead to future Bay fill for port development.

MTC concurred with the EDAP's position that a northern alignment is more desirable because it would provide a "gateway to Oakland" and would offer enhanced views of Oakland. Also, there are less constraints in designing and constructing a cable-supported bridge on the northern alignment than on the southern alignment.

The staff believes EDAP's final recommendations adequately address BCDC concerns about Bay fill.

Public Access. Section 66602 of the McAteer-Petris Act requires the Commission to make a finding that any project which it approves provides "the maximum feasible public access, consistent with a proposed project." However, SB 60 (Kopp) enacted in 1997 added the following provision to the Streets and Highways Code:

> *Notwithstanding any other provision of law, local and state permitting authorities shall not impose any requirement that a bicycle, pedestrian, or mass transit facility be constructed on the San Francisco-Oakland Bay Bridge as a condition for issuing any permit, granting any easement, or granting any other form of approval needed, for the construction of a new bridge.*

As a result of this revision in state law, the overall project will still have to meet the McAteer-Petris Act standard of providing "maximum feasible public access consistent with [the] proposed project," but the Commission will not be able to achieve this objective by imposing a condition requiring bicycle and pedestrian access on the replacement bridge as part of a permit to Caltrans for the bridge project.

With this change, the Metropolitan Transportation Commission has the principal responsibility for determining whether a bicycle and pedestrian lane should be provided on the replacement bridge. Moreover, MTC also has control of the funds needed to pay for bridge amenities, such as a pedestrian and bicycle lane. SB 60 added a $1 toll surcharge on all Caltrans-operated Bay Area bridge beginning on January 1, 1998 and remaining in effect for approximately eight years to pay the Bay Area's funding share of the entire toll bridge seismic retrofit program. SB 60 also allows MTC to extend the toll surcharge for an additional two years to pay for the following "amenities" for the Bay Bridge eastern span project: (1) a cable-supported long span; (2) bicycle/pedestrian access on the new span; and (3) replacement/replacement of the TransBay Terminal in San Francisco.

In the public hearings held by the Bay Bridge Design Task Force and EDAP, bicycling and recreation interests have advocated that a bicycle and pedestrian pathway should be provided on an eastern replacement span and that a bicycle and pedestrian lane should be incorporated into plans to retrofit the existing western suspension portion of the Bay Bridge. Moreover, as noted above, in order for BCDC to issue a permit for the replacement and retrofit work, the Commission will have to find that the project provides "maximum feasible public access consistent with the project."

According to Caltrans, the originally estimated cost to provide a bicycle lane on the eastern span varied between $84 and $102 million, depending on the type of bridge and alignment, and on the western span it is approximately $65 million. Using very general estimates of the number of bicyclists who would ride over the bridge, the Commission concluded that the cost per bicyclist may exceed the cost of providing a shuttle service across the bridge, on BART or on an expanded ferry system. Therefore, the Commission preliminarily found that the replacement span should be designed to accommodate bicycle and pedestrian use unless it would be less expensive to provide comparable access in some other fashion or such access is found to be infeasible.

The EDAP recommended a bicycle and pedestrian lane, but MTC raised the issue, based on estimated future bicycle usage, of whether the high cost of providing a bicycle/pedestrian lane can be justified. MTC recommended that Caltrans continue its evaluation for providing a bicycle/pedestrian lane at a more reasonable cost. At its May 29, 1998 meeting, the EDAP was advised that a pedestrian and bicycle path is now estimated to cost between $33 and $50 million.

SB 60 defines the baseline cost of the new eastern span as $1.285 billion, which includes $80 million toward the cost of a cable-supported main span. The two-year toll surcharge extension would generate $230 million. Thus, the total budget for Bay bridge "amenities" is $310 million ($80 million + $230 million).

The most recent estimates of the costs of the amenities recommended by the EDAP are as follows:

Suspended long span	$171 million
Bicycle/pedestrian path	$50 million
Total	$221 million

Thus, after paying for the "signature" bridge and a bicycle and pedestrian pathway, a $89 million balance would remain in the "amenities" budget. Therefore, on May 29, 1998, the EDAP recommended that a two-direction pedestrian and bicycle path should be provided on the south side of the replacement span.

The $50 million cost of a 15-foot-wide pedestrian and bicycle path is under four percent of the total cost of the replacement bridge and can be accommodated in MTC's "amenities" budget. Thus, it is economically feasible to provide a pedestrian and bicycle pathway on the replacement bridge, which would at least partially address the requirement of the McAteer-Petris Act that "maximum feasible public access consistent with [the] proposed project" be part of any project approved by

BCDC. Therefore, the staff recommends that the Commission direct BCDC's representative on the Task Force and MTC to support funding for a bicycle and pedestrian path on the replacement bridge to insure that the replacement bridge will provide maximum feasible public access.

Rail Transit. The *San Francisco Bay Plan* policies concerning transportation state in part, that "if a route must be located across a waterway, the following provision(s) should apply: To provide maximum ultimate capacity on any new route that is allowed over or under a waterway (and thus to minimize the number that might have to be allowed in the Bay), the design of the route should, if feasible, accommodate future mass transit facilities and subsequent installation of automatic power and guidance elements for vehicles." This policy clearly applies to any new "route" (i.e., bridge) over a waterway, but it may not necessarily apply to a replacement bridge. Therefore, future rail service may not have to be required on the new east span. Moreover, as noted above, SB 60 of 1997 prohibits all state and local agencies, including BCDC, from imposing "any requirement that a...mass transit facility be constructed on the San Francisco-Oakland Bay Bridge as a condition for issuing any permit...for the construction of a new bridge."

MTC recommended that the new eastern span should be designed to accommodate the possibility of future rail service, and Caltrans has indicated that the new span will be strong enough to accommodate passenger light rail service. Therefore, the staff believes EDAP's final recommendations adequately address BCDC concerns about rail transit.

Environmental Impacts. The Bay Bridge is eligible for listing on the National Register of Historic Places. However, the eastern span of the bridge is built on recent fill that does not contain either historic or prehistoric sites which could be disturbed by the construction of a new bridge. Additional fill and dredging required for the construction of the new bridge and demolition of the existing bridge would impact aquatic, wildlife and other natural resources of the Bay. Mitigation for significant adverse environmental impacts of the Bay fill would be have to be provided as part of the project. However, the environmental impacts and attendant mitigation measures would likely be similar in scale for all of the alternative designs and alignments.

The Commission did not make any recommendations or other preliminary conclusions on the potential environmental impacts of the project pending the completion of Caltrans' environmental evaluations. However, the staff believes EDAP's final recommendations address—as adequately as possible at this stage of design—BCDC concerns about the environmental impacts of the project.

BCDC Involvement in the Bridge Design Process. Section 66604 of the McAteer-Petris Act provides that the "Legislature further finds and declares that in order to protect the present shoreline and body of the San Francisco Bay to the maximum extent possible, it is essential that the Commission be empowered to issue or deny permits, after public hearings, for any proposed project that involves placing fill, extracting

materials or making any substantial change in use of any water, land or structure within the area of the Commission's jurisdiction."

The bridge type alternatives were first narrowed to three configurations. Later, the alternatives were again narrowed to two. The Bay Bridge Design Task Force process has worked well to provide oversight to Caltrans, to facilitate public involvement in this important issue, and to incorporate BCDC's views early in the design process. To take continued advantage of the benefits of this arrangement, the Commission recommended that both the Task Force and the EDAP should remain in place to select a bridge design type and to oversee the detailed design of the bridge.

A primary reason for BCDC's involvement on the Bay Bridge Design Task Force is to ensure that the policy issues BCDC will have to face when Caltrans applies for a permit for a replacement bridge are addressed from the outset in the planning and design of the bridge. To ensure that BCDC's policy concerns are fully addressed, BCDC asked to be given the opportunity to hold a public hearing on the fundamental issues of concern to BCDC and offer BCDC's formal views on the matter to MTC, prior to the Metropolitan Transportation Commission taking any action on the final recommendations of the Bay Bridge Task Force.

MTC agreed with the Commission's recommendations for continuing participation of the Engineering and Design Advisory Panel and the Bay Bridge Design Task Force during the design stage of the project and for the Commission's preliminary consideration of the final design alternatives. Therefore, the staff believes the Commission's concerns about being involved in the design process are being adequately addressed.

BAY BRIDGE DESIGN TASK FORCE
ENGINEERING AND DESIGN ADVISORY PANEL

Engineering and Design Considerations for the East Span Replacement of the San Francisco Oakland Bay Bridge

General Requirements

The new span will be constructed in a manner to allow continued operation of the existing span with a minimum amount of time upon completion to transition to the new span.

Post-Earthquake performance of the new structure should be high. The bridge will be designed to provide emergency as well as normal traffic service (lifeline service) after an earthquake on either the Hayward or San Andreas fault systems. Some damage during a large seismic event is expected — e.g., minor plastic hinging and thermal deck joints requiring replacement — that should be managed (i.e., location and quantity controlled by design). No damage in the foundation should be tolerated as it cannot be easily accessed. Even if the design plans for no damage in the system, design of a fuse for location and ductility should be completed.

The new structure should accommodate the existing level of traffic capacity (five lanes of traffic in each direction) with the addition of a standard shoulder on at least the right side in each roadway.

Geometry will be compatible with the tunnel at Yerba Buena Island and the westerly approach to the Oakland toll plaza.

Access will be provided to Yerba Buena Island (YBI). The new design should be as compatible as is reasonable with present use and future development of YBI and Treasure Island (e.g., United States Coast Guard (USCG) and the City of San Francisco island use plans)

A single clear portal 42 meters (138 feet) vertically above the mean high water level and a minimum of 143 meters (500 feet) horizontally between fenders will be provided for marine traffic over the existing navigational channel just east of YBI. (The USCG will make the final determination.)

The existing bridge will be removed after completion of the new span.

Additional considerations that may impact the design of the bridge include any height restrictions by the Federal Aviation Administration and scope changes which will be determined by the Bay Bridge Design Task Force and the Metropolitan Transportation

EXHIBIT 1

Commission after public hearings and in consultation with the Bay Conservation and Development Commission (BCDC) and Caltrans. These include:

- the width of the shoulder, if any, on left side of the roadways,
- the addition of pedestrian and bicycle facilities,
- the accommodation for future rail.

Structural Considerations

The design should anticipate potential inefficiencies of the foundations in bay mud (see the Caltrans' East Span of the San Francisco-Oakland Bay Bridge, Log-of-test-Borings, April 18, 1997).

For efficient span lengths and foundations, a configuration is selected by envisioning an efficient foundation design in which group efficiency is high (i.e., few piles and/or large pile spacing) and few, if any, additional piles are required for load case VII (controlling earthquake) beyond required piles for load cases other than load case VII (i.e., foundation service loads are increased by increasing span lengths until required capacities due to service loads are near to required capacities due to the seismic load case).

The above-described design process will generate several different span lengths as the soils and height of the roadway vary. If the relatively great variation in structure type of the existing east spans is to be avoided, a degree of compromise should be anticipated between economy and structure type continuity in pursuit of structure continuity.

Desired span lengths tend to define superstructure type, first by feasibility and then by economy. Minimum depth-to-span ratios must be respected in order to avoid compromising camber prediction methodologies and live load deflection limiting criteria.

On stiff sites the structural system should be soft and on soft sites the structural system should be stiff.

Bridge response to seismic ground motions are likely to be dominated by a velocity pulse. A rocking system should be considered to minimize damage and plastic deformation at the time of a pulse and following an earthquake.

Torsional capacities within the superstructure must be capable of carrying seismic demands.

Drop-type vulnerabilities should be avoided and elimination should be considered.

Structural design should consider modern materials, construction techniques and seismic devices. The type selection should respect constructability and the capacity to maintain quality assurance.

An economical solution is an important consideration in type selection.

Design Considerations

The bridge should integrate into the site and the surrounding environment by reflecting the grand scale of the San Francisco Bay, by harmonizing with the existing west span of the bridge and by landing gracefully on the Oakland and Yerba Buena Island landfalls. The replacement bridge should by contrast or similarity, compliment the existing San Francisco bridge suspension span. They should feel related in some way that makes the two bridge elements into a whole. One bridge should not diminish the visual quality or importance of the other.

The design of the replacement span should adhere to the established principles of design so that the structure's form, alignment, and detailing exhibit continuity and order. Where spans or structural systems change within the new east span, structural system integration will be important for visual continuity.

The new bridge should be visually memorable and convey a sense of the gateway to Oakland. Views from the bridge when traveling toward Oakland should consider Oakland's central business district and waterfront.

The bridge should convey to the user that the user is on a bridge and not an extension of the on-grade highway system. There should be some visual expression of the long span bridge section to the user.

The bridge should provide a measure of visual continuity for motorists regardless of what structural system is used equal to, but not necessarily the same as, that of the existing westbound portion of the east span bridge.

The girders, piers and rails of the bridge should generally appear slender and should provide for views of the Bay by motorists using the bridge.

Guard rails and hand rails should be designed to provide maximum transparency for maintaining views of the Bay while meeting appropriate safety criteria.

Landscaping around the bridge should replicate the existing natural surroundings of the Bay shoreline.

Night lighting of and on the bridge is an important design consideration.

Environmental

The design should strive to minimize impact to the bay and to Yerba Buena Island (YBI)

The new span should be aligned to minimize, and mitigate impacts on sensitive wetland areas in the Emeryville Crescent.

The design should minimize bay fill and dredging.

Design and construction impacts on wildlife should be minimized and mitigated — many species of wildlife could be impacted by this project including the peregrine falcon, winter-run Chinook salmon, double-crested cormorant, least tern, clapper rail, pacific herring, and harbor seal. Removal of the nesting sites during selected times of the year will impact the birds, dredging during selected times of the year may impact the fish, and boat access may impact the harbor seals. Additionally, nesting sites for both the peregrine falcon and the double-crested cormorant should be sustained on or near the new span.

Replacement bridge foundation locations should, to the extent feasible, avoid known prehistoric, potential historic archaeological sites and historic properties on YBI. The ramps connecting the bridge to YBI should have the minimum impact on the natural features and landscape of the island.

Highway design standards

The following geometrics on the bridge roadway will be maintained:

- design speed of 100 kilometers per hour (65 miles per hour)
- maximum allowable deck grade of 2.74% (the existing maximum grade)
- minimum horizontal curve radius on mainline of 1000 meters (3000 feet) (based upon stopping sight distance (SSD) and is function of 3 meter shoulders — this number maybe modified depending on final determination of shoulder widths)
- minimum right side shoulder width of 3 meters (10 feet)
- lane width of 3.6 meters (12 feet)
- inside to inside of railings of a roadway with a 3 meter right shoulder and a 1.2 meter left shoulder (left shoulder subject to final determination) without a ped-bike lane is 22.2 meters and with a ped-bike lane is 26.4 meters (including 0.6 meters to construct a barrier between the roadway and ped-bike lane)
- maximum superelevation rate of 0.04 meters/meter for a 1000 meter curve
- the stopping sight distance (SSD) is 190 meters as a function of a 100 kilometers per hour speed
- minimum vertical curve length of (2V) in which V equals the design speed

- minimum horizontal clearance of 3 meters (10 feet) (which may change dependent on final determination of shoulder widths
- minimum vertical clearance of 5.1 meters (16.5 feet).

The following geometrics on the bridge ramps will be maintained (conforming to the island may cause some compromises of these standards):

- minimum design speed at an exit nose 80 kilometers per hour (50 miles per hour)
- minimum design speed at a terminus of 40 kilometers per hour (25 miles per hour)
- lane widths of 3.6 meters (12 feet)
- right shoulders of 2.4 meters (8 feet)
- left shoulders of 1.2 meters (4 feet)
- Stopping Site Distance of 130 meters (430 feet) as a function of a 80 kilometers per hour speed (50 miles per hour
- maximum allowable deck grade on a ramp of 8%
- maximum superelevation of 12% for a curve radius equal to or less than 190 meters (625 feet)

Pedestrian-bikeway design standards

If included, the two-way pedestrian-bikeway will follow the following standards:

- be compliant with Americans with Disabilities Act (ADA) regulations
- be separated from motorized traffic by a barrier
- minimum width of paved path from barrier to barrier of 3.6 meters (12 feet)
- minimum vertical clearance of 2.5 meters (8 feet)
- minimum bicycle path design speed of 40 kilometers per hour (20 miles per hour).

Any bicycle and pedestrian way should be integrated into the bridge design so that it contributes to the overall order and continuity of the bridge design. Periodic outlooks should be provided at intervals along the bicycle-pedestrian way.

Maintainability

Long term maintenance must be considered. The selection of structure type, a variety of potential system components, and structure materials should consider necessary maintenance programs and evaluate the likelihood of such programs receiving necessary consistent funding.

Maintainable thermal expansion joints will be required but should be at a maximum spacing consistent with bridge movement.

Commissioner Kelly pointed out the importance of the Oakland Harbor project, not only to Oakland and Alameda County, but to the entire Bay Area. She reminded the Commission that a letter was passed out this morning signed by Alexis Strauss, the Director of the Water Division at Region IX, U.S. Environmental Protection Agency also supporting this resolution and encouraging BCDC to do likewise.

Commissioner Schwinn highlighted passages from the Alexis Strauss letter for the Commission. She urged the Commissioners to read the letter and support the resolution.

Commissioner Carruthers shared the concerns of Save The Bay about the particulars of the project and how to deal with the actual permitting process. He pointed out that Commissioner Corbin made the most telling and persuasive comment of all and urged the Commissioners to go ahead and approve the resolution with the understanding that the particulars of the project will be dealt with as they are formulated.

VOTE: The motion carried by a roll call vote of 19-0-1 with Commissioners Barna Jr., Bierman, Bruzzone, Kelly, Corbin, Fong, Goldzband, Hayes, Valentine, Klass, Carruthers, Ortiz-Cashman, Rippey, Rose, Schwinn, Uilkema, Warner, Vice Chairman Siracusa and Chairman Tufts voting "YES," with no "NO," votes and Commissioner Kondylis abstaining.

12. **Public Hearing and Vote on Preliminary Design of the Replacement Structure for the Eastern Span of the San Francisco-Oakland Bridge.** Steve McAdam gave a short presentation on the Staff report and Recommendation on the bridge design which was recommended by the Bay Bridge Engineering and Design Advisory Panel and forwarded to the Bay Bridge Design Task Force and the full MTC for this consideration. He then introduced Dennis Mulligan of Caltrans to present the recommended replacement structure and to explain the process and deliberations undertaken to this point.

Mr. Mulligan explained that the span will reach from the Oakland shore to Yerba Buena Island an does not include the West span, which is a separate project. BCDC previously granted a permit to the seismic retrofit of the West span and construction has commenced. An EIS is being prepared for this project and in that document the full range of alternatives will be looked at.

MTC has embarked upon a decision-making process for the local desired option, which will allow Caltrans to commence design prior to completing the environmental document.

The alternatives looked at are based on providing seismic safety from the Oakland shore to Yerba Buena Island with a life line structure, meaning that after an earthquake vehicles can get across. Within the EIS a series of design variations will be looked at as well as a variety of different signature span types, bike and pedestrian access options, and profiles.

Mr. Mulligan discussed the geological challenges and solutions acceptable for this project. He used slides to illustrate his remarks. The challenge of construction without interfering with the flow of traffic was explained. The NEPA process was also explained.

He pointed out that public participation can take place in a variety of different processes. MTC has task force meetings and work shops, which are public hearings; Caltrans has had a series of open houses early on; a draft EIS is being prepared which will have formal comments; the engineering design advisory process that MTC has established includes BCDC's Design Review Board and Engineering Criteria Review Board. The existing bridge concepts and bike recommendations are the result of that public involvement shaping the outcome.

MTC will make recommendations next Wednesday to the State, and Caltrans will commence Risk Design so this bridge can be built as soon as possible because of the safety risk. Ultimately, the environmental document is the legal decision making document. FHWA and Caltrans are the decision makers, but wish to develop a project consistent with local and regional planning.

He further stated that Caltrans' position on this project is that they will build as much bridge as the Bay Area wishes to purchase. This includes various types of bridges, bike paths and other issues. The community should decide this because they are paying for it.

Another compelling policy of BCDC is to create opportunities for things to happen that will alleviate the pressure for future fill. The Bay bridge and BART are now almost at capacity and there may be another opportunity for another vehicular bridge or another transit corridor. Having the flexibility for this lane could conceivably alleviate that need and therefore alleviating the pressure for fill for a transbay commutation.

Vice Chairman Siracusa asked the Commissioners not to direct him to ask MTC for funds for bicycle but ask instead to have that with two conditions, i.e. that it be designed now to accommodate future light rail, buses or HOV, and that it be accompanied by a resolution allowing future policy makers the flexibility to convert that lane to transit or HOV.

Mr. Travis respectfully disagreed with the Vice Chairman and reminded the Commission that without a resolution a position can always be changed later on. Future Commissions cannot be bound. Moreover, with respect to Caltrans, the bicycle and pedestrian lane is to be hung off the side of the bridge deck. Engineering that in a fashion that would accommodate rail, would be far more costly than a few million dollars. Simply designing the existing bridge to accommodate future rail will cost another 24 million dollars. Making the cantilevered section able to accommodate rail would cost significantly more than that.

The path is also outboard of the cables coming down, so if that were a traffic lane, HOV or carpool lane, it would be isolated from the rest of the traffic and one couldn't safely move in and out. This suggestion would be both extra-ordinarily expensive and probably not practical.

Ken Bukowski, Mayor of Emeryville spoke in support of the bicycle/pedestrian access across the bridge. Everybody should have the right to use a public facility. He also addressed the question of inter-city passenger rail. The Transbay Terminal is right in the heart of downtown and if rail is to come to this area, it must have a place to go and the Transbay Terminal is the only place where this could realistically go and tie into the South Peninsula. Constraining the bridge by not allowing inter-city rail would have a serious impact on the economic viability of the area as well as the ability to move people. What is going to relieve the congestion is a tie-in with the I-80 rail corridor by providing direct rail service all the way from Sacramento to San Francisco.

Victoria Eisen with the San Francisco Bay Trail project endorsed BCDC's staff recommendation to direct the Commission's representative to MTC to vote next week in favor of funding a bicycle and pedestrian path on the new East span of the Bay Bridge. The Bay bridge is a critical link in the 400-mile trail around and across the San Francisco and San Pablo Bays. She also addressed Vice Chairman Siracusa's proposal to condition support for the pathway and allowing policy makers to, in the future, convert the bike lane to transit or HOV. This proposal is not in line with the visionary nature of BCDC and she urged the Commission to reject this idea and instead use the opportunity to provide one of the most important pieces of public access on the Bay.

She further asked the Commission to direct Commissioner Siracusa to give his unconditional support for an Eastbound pathway and, in addition, to support funding a Westbound pathway when the opportunity arises.

Alex Zuckerman spoke on behalf of REBAC and the Bay Bridge Bicycle/Pedestrian Advisory Committee which came up with a proposal adopted by EDAP for a 15-foot-` wide pathway on the South side, about one foot above the deck level allowing bikes better views without impinging the view of the motorists.

He disagreed with Vice Chairman Siracusa's suggestion. EDAP came up with this proposal, money is there and if the Governor signs AB2038, there will be the capability of funding the West span as well as the East span. He asked the Commission to approve the EDAP recommendation, approve the staff recommendation and direct Mr. Siracusa to vote yes on the path with no caveats.

Commissioner Barna asked Mr. Zuckerman if the ability to bicycle across the Bay Bridge entirely for commute purposes is equivalent to the ability to walk across, or the ability to drive across. Mr. Zuckerman replied that it would be a fairly easy commute from Emeryville, Berkeley, Oakland and San Leandro. Pedestrians will probably not walk all the way across, but may be more like on the Golden Gate Bridge, at least walk partially across.

Commissioner Barna explained to the Commission that in State law bicycles are a mode of transportation and bicycle lanes are to be funded separately and there is a whole category on how to do that. To the extent that the

MOTION: Commissioner Goldzband moved, second by Commissioner Barna, to close the public hearing. The motion carried.

Chairman Tufts asked Mr. Mulligan about the discrepancy of the cost of a bike lane vs the cost of a bike lane that can accommodate light rail. Mr. Mulligan indicated that on the West side it would be significantly more, but had not been costed out.

Commissioner Klass questioned the feasibility of carrying cars or a light rail on a path outside of the cables and cantilevered. Mr. Mulligan responded that it would be feasible but it would change the shape of the structural section and that would be the additional cost.

Commissioner Corbin stated she was in favor of bicycle/pedestrian/rail and keeping the Transbay Terminal where it is. She asked if the recommendation Commissioner Siracusa suggested would be much more expensive and Mr. Mulligan responded that a formal cost estimate for that configuration has not been made because EDAP never requested that. In response to an inquiry from Commissioner Goldzband he said that the cost of light rail conversion has two elements. One is a strength element and the other is what they call a straight current protection.

Chairman Tufts inquired if staff would change its recommendation if Vice Chairman Siracusa's proposal would cost $2 million. Mr. Travis replied no, because the bicycle path to Yerba Buena has some benefits - you can get around the island - and adding an outrigger on the Western span is estimated around $65 million. Legislation is pending that would allow that. Putting a rail outrigger on the Western span would be extraordinarily expensive and you would have to drill another tunnel through Yerba Buena Island. Looking just at the eastern span, it does seems to be a prudent course of action to take.

A lengthy discussion followed about the pro and cons of Commissioner Siracusa's proposal as it relates to the Bay Plan and other BCDC policies.

Commissioner Levine explained arriving at a different number of cost per bicyclist which is $4 per rider at the current population and well justifies the expenditure. Commissioner Bruzzone spoke to the collecting of tolls from bicycles; he also inquired about the proposed land use at Yerba Buena that could be affected by the alignment.

Commissioner Warner pointed out that the people using the bridge have formed the consensus to develop for funding this improvement. The bike path is funded by the money generated by the increased tolls. He questioned if a bike path would be the most economic use of the dollar; he arrived at a $8 per bike ride cost. Maintaining flexibility should be looked at carefully.

Commissioner Rose agreed that having flexibility in design is most desired, given the size of this project. She stated that she is firmly behind a permanent bike and pedestrian lane on this bridge; that the Transbay Terminal should stay and instruct the representative to vote to keep it. Commissioner Kondylis agreed with Commissioners Corbin and Rose, but that public access and bicycle paths should be free.

Commissioner Kondylis asked Mr. Mulligan about proposed lighting of the span. Mr. Mulligan replied that there most probably will be architectural lighting. Two well known design teams were employed to develop the alternatives.

Commissioner Bierman declared her absolute preference for a bike lane and the possibility of a high speed rail.

Another discussion followed about the cost of converting the bike lane some time in the future.

MOTION: Commissioner Siracusa moved to adopt the staff recommendation with the following exception: the provision that directed him to support the pedestrian and bike lane on the bridge, but to support it instead with the conditions already stated; one being that the design now accommodate some future change of transit use and that there be an expression that, if the public interest were served, a future policy body could make that change.

Commissioner Corbin stated that she could not support the motion because there is no reason why in the future another vote can be taken to do something different. We must deal with today and put a bicycle path on it. Another discussion ensued about the light rail conversion and Commissioner Siracusa's amendment.

TE OF CALIFORNIA PETE WILSON, Governor
AN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
RTY VAN NESS AVENUE, SUITE 2011
FRANCISCO, CALIFORNIA 94102-6080
NE: (415) 557-3686

June 19, 1998

Ms. Mary King, Chair
Bay Bridge Design Task Force
Metropolitan Transportation Commission
Metrocenter
101 Eighth Street, Third Floor
Oakland, California 94607

SUBJECT: Replacement of the Eastern Span of the San Francisco/Oakland Bay Bridge

Dear Chair King and Other Task Force Members:

Over the past year, a Bay Bridge Design Task Force, created by the Metropolitan Transportation Commission (MTC) and assisted by an Engineering and Design Advisory Panel (EDAP), which includes all of the members of BCDC's Design and Engineering Criteria Review Boards, has deliberated on the selection of the type of structure that should be used to replace the eastern span of the San Francisco-Oakland Bay Bridge as part of the seismic retrofit of the overall span. On May 29, 1998, the EDAP recommended to the Task Force that the replacement structure should be a single-tower, self-anchored suspension bridge joined to the East Bay shoreline by a causeway, and that a bicycle and pedestrian path should be provided along the south side of the new bridge.

On June 18, 1998, the San Francisco Bay Conservation and Development Commission considered the recommendation of the EDAP, along with a recommendation from its own staff, and: (1) endorsed the EDAP recommendations because they adequately address, at this level of design, the issues BCDC will have to consider when Caltrans submits a permit application for the replacement bridge; and (2) directed BCDC's representative on the Task Force and MTC to support funding for a bicycle and pedestrian path on the replacement bridge that is designed now to accommodate future light rail, buses or high occupancy vehicles so long as bicycle and pedestrian access is permanently guaranteed. The Commission also indicated that, if the Bay Bridge Design Task Force or MTC determines that funding should not be provided to strengthen the bicycle and pedestrian path now for that purpose, then BCDC's representative is directed to support permanent pedestrian and bicycle access on the replacement bridge anyway.

If you have any questions, please let me know.

Very truly yours,

WILL TRAVIS
Executive Director

WT/SAM/ra
cc: Lawrence Dahms, MTC
William Hein, MTC
Angelo Siracusa, BCDC

PORT OF OAKLAND

April 1, 1999

Ms. Mara Melandry,
Environmental Manager, SFOBB
California Department of Transportation
District 4 Toll Bridge Program
PO Box 943660
Oakland, California 94623-0660

Re: Radio Point Beach

Dear Ms. Melandry;

Your March 16, 1999 letter to Rick Wiederhorn inquiring about the Port of Oakland's plans and assessment of what we refer to as 'Radio Beach' on the north shore of the Bay Bridge Oakland touchdown peninsula has been referred to me. I will try to answer your questions, as follows.

Your reference to the material describing Radio Beach in the Port's website actually refers to a informational brochure that was published by the Port several years ago. I am enclosing the original brochure for your records and future reference. It was transferred onto the website as a public information piece highlighting areas on the Oakland shoreline that are accessible. It only describes what currently exists at Radio Beach and other locales where the shoreline is accessible. Specifically, it is not a planning document.

You are correct that the Port of Oakland is the current owner of the property. Although there are no specific facilities, the site is accessible from the bridge approach via an access drive serving the radio station. It has been used historically for passive enjoyment as people have found their way down there. The site has been left in its natural state; never having been developed, programmed or (until publication of the above-referenced brochure) promoted as a recreational facility.

To specifically answer your questions:

1. There really isn't a boundary to the site. The only prescribed site outside of Caltrans' right-of-way in the vicinity is the radio station's leasehold (see attached map). The remainder of the property on the shoreline is not described or parceled.

2. The Port has no plans to more fully develop the site, or to install any visitor facilities.

3. Your question regarding the Port's assessment of the site per CFR 771.135 © and (d) is difficult to answer. I hesitate to draw a specific conclusion. On one hand, the site is publicly owned open space that has been used sporadically by individuals for recreational enjoyment. However, it has not been developed as a park, and is not identified as a specific facility in any agencies' inventory of parks. Nor should it be construed to be a 'recreation area'. Like many similar areas in the Bay Area, it remains in its natural state and condition, and is informally used by the public as such. Likewise, it is a natural gathering point for waterfowl and other wildlife, but not been set aside or designated as a refuge.

530 Water Street ■ Jack London Square ■ P.O. Box 2064 ■ Oakland, California 94604-2064
Telephone (510) 272-1100 ■ Fax (510) 272-1172 ■ TDD (510) 763-5703 ■ Cable address, PORTOFOAK, Oakland

It is equally difficult to assess the significance of the site. Given its small size, proximity to the Bay Bridge traffic and poor access, it is hard to call it a significant site. There are many other places on the Bay and within Oakland that offer better passive recreational experiences. At the same time, views of the Bay are unique and expansive, and the site hosts several natural resources and attributes that are generally valued in an urban setting. These include wetland vegetation and habitat for endangered species.

I trust that this information will help you. If not, or if you would like more, please call me at 510-272-1175.

Sincerely,

James McGrath

James McGrath
Manager, Environmental Planning

cc: Rick Wiederhorn
Diane Tannenwald, OPWA

TE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

EPARTMENT OF TRANSPORTATION
BOX 23660
KLAND, CA 94623-0660
D) 286-4444
D (510) 286-4454

May 7, 1999

Sample

Chairperson Tony Cerda
Coastanoan Rumsen Carmel Tribe
3929 Riverside Drive
Chino, CA 91710

Dear Chairperson Cerda:

Your name was provided to Caltrans by the Native American Heritage Commission as a potentially interested party for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project which involves seismic retrofit work on the bridge from Yerba Buena Island in San Francisco Bay to the Oakland shore. The project is anticipated to result in impacts to prehistoric archaeological site, CA-SFR-04/H, on Yerba Buena Island. The site has been determined to be significant under the National Historic Preservation Act (NHPA) for its potential to yield data important to prehistory. Pursuant to Section 106 of the NHPA, we request from you any information or concerns you have about this site and on any issues you would like to see addressed in the treatment plan for the site.

In addition to complying with the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act (NAGPRA) may also apply to CA-SFr-04/H. Since CA-SFr-04/H is on federal land, any human remains, funerary objects or items of cultural patrimony which may be found during archaeological excavations will be subject to the provisions of NAGPRA. This law calls for consultation with Native Americans to determine whether any Native American claims direct lineal descent from former inhabitants of the site; whether the site is within the territory of a federally recognized tribe; and whether there is a federally recognized group who would claim cultural affiliation with the site. Yerba Buena Island lies within Ohlone territory, but it is possible that the island may have been used by multiple cultural groups such as Cost Miwok or Yokuts. One burial and probable associated grave goods recovered from the site in 1934 are curated at the Hearst Museum at U.C. Berkeley. These remains and items have been inventoried under NAGPRA, but have not been repatriated.

We would like to know if you have any concerns regarding the identification, evaluation and treatment of human remains, associated grave goods and items of cultural patrimony which might be uncovered at CA-SFr-04/H.

A list of individuals and groups who will receive this letter is attached. Please contact us if you know of additional individuals or groups who should be informed about the project. If you have any questions concerning this letter, please call Janet Pape, Toll

Chairperson Tony Cerda
May 7, 1999

Bridge Environmental Planning, at (510) 286-5615 or write to her at the address on the letterhead. You may also e-mail Ms. Pape at Janet.Pape@dot.ca.gov. Thank you for your interest in this important project.

Sincerely,

HARRY Y. YAHATA
District Director

By:

Mara Melandry

Mara Melandry
SFOBB Environmental Manager

Enclosure

C: Larry Myers, NAHC
Lou Wall, US Navy
Kenn Parsons, US Navy
Danielle Huey, US Navy
Ann Marie Conroy, CCSF
Carol Meyer, USCG

List of Addressees for May 7, 1999 letter

(List provided to Caltrans by the California Native American Heritage Commission)

Ms. Linda Yamane
1195 B Rousch Ave.
Seaside, CA 93955

Mr. Andrew Galvan
The Ohlone Indian Tribe
PO Box 3152
Mission San Jose, CA 94539

Chairperson Ann Marie Sayer
Indian Canyon Mutsun Band of Costanoan
PO Box 28
Hollister, CA 95024

Ms. Katherine Erolinda Perez
1234 Luna Lane
Stockton, CA 95206

Chairperson Rudy Rosales
Ohlone/Costanan-Esselen Nation
2505 David Ave
Pacific Grove, CA 93950

Mr. Grant Smith
4309 Chico Avenue
Santa Rosa, CA 95401

Ms. Kathleen Smith
Federated Coast Miwok
1778 Sunnyvale Avenue
Walnut Creek, CA 94596

Chairperson Rosemary Cambra
Muwekma Indian Tribe
503 A Vandell Way
Campbell, CA 95008

Chairperson Irene Zwierlein
Amah Tribal Band
789 Canada Road
Woodside, CA 94062

Ms. Jakki Kehl
5461 Beaver Lane
Byron, CA 94514

Chairperson Tony Cerda
Coastanoan Rumsen Carmel Tribe
3929 Riverside Drive
Chino, CA 91710

Mr. Gene Buvelot
1025 Susan Way
Novato, CA 94947

Chairperson Greg Sarria
Federated Coast Miwok
P.O. Box 481
Novato, CA 94948

Mr. Tim Campbell
Federated Coast Miwok
76 Wakefield Avenue
Daly City , CA 94015

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

MEMORANDUM

To: Secretary Rodney Slater
From: Willie L. Brown, Jr.
Date: May 10, 1999
Re: San Francisco Oakland Bay Bridge Replacement Project and *Alexandria Historic Restoration and Preservation Commission v. U.S. Department of Transportation*

I have been briefed by my staff with regard to a recent decision issued by the U.S. District Court in the District of Columbia, Alexandria Historic Restoration and Preservation Commission v. U.S. Department of Transportation.

As I am sure you are aware, the decision finds that FHWA abused its discretion in issuing a Record of Decision to proceed with the $1.6 billion replacement project for the Woodrow Wilson Bridge. The parallels to the current situation with the City of San Francisco and FHWA and Caltrans are startling.

First, the Court found that the agency did not look at all reasonable alternatives as required under NEPA. The City of San Francisco has the same issues with FHWA and Caltrans concerning the S-1 alignment, which was not reviewed in the Draft Environmental Impact Statement. Caltrans claims the S-1 was jettisoned from study because of a conflict with the East Bay Municipal Utilities District (EBMUD) sewer outfall. Our consulting engineers believe this conflict, with a low-risk utility, can be easily dealt with.

San Francisco hired Korve Engineers to address a modified S-1 alignment with minimal impacts to the Coast Guard and the Port of Oakland. EBMUD has made it clear that the outfall can be straddled.

The US Navy concurs in the plan to evaluate the modified S-1 alignment. FHWA and Caltrans must keep in mind that a southern or northern alignment requires the taking of Navy (future City of San Francisco) property. Under a southern alignment, the bridge will be equidistant from the Historic District including Nimitz House and the Coast Guard barracks. Likewise, the Navy and City, under an S-1 alignment would lose 3+ acres, with the Coast Guard losing 1.5 acres, leaving the operations of the Coast Guard

intact. If relocation of barracks were required, Coast Guard owns a large portion of Yerba Buena Island on which to build housing.

We have also hired, at significant expense, J. Muller International (JMI), a worldwide bridge engineering firm to review the northern and S-1 alignments. Their study concludes that the S-1 alignment is the superior alignment, saves $57 million, and the issue of the sewer outfall can easily be accommodated.

Given this most recent decision, the fact that FHWA and Caltrans continue to ignore the S-1, as a reasonable alternative, is grounds for the same type of relief granted by the Court in Alexandria.

The Court also found that impacts to the historic district were not fully understood leaving the requirements of NEPA unsatisfied. It has been San Francisco's contention that the new bridge - three times the width of the current structure - will overwhelm, if not destroy, the historic properties on Yerba Buena Island. The City and Navy have made it abundantly clear that neither party will execute a Memorandum of Agreement. Without the MOA, there is no project.

Finally, the Court found that construction impacts of the replacement project had not been thoroughly investigated. The City of San Francisco has continuously stated to FHWA and Caltrans that the devastation to Yerba Buena Island including regrading and recontouring this most beautiful Island was ignored in the Draft EIS.

Caltrans is still not sure of the type of construction impacts from the proposed project. For example, the steep terrain of the Island will require massive changes to the landscape to place the 80+ pilings for each of the temporary structures - something that was completely ignored in the DEIS.

The City is confident that a Court would find the FHWA/Caltrans environmental documents deficient in evaluating construction impacts.

Given this current decision and the findings of our engineering experts, I would like to discuss the possibility of pursuing an economically, aesthetically and environmentally appropriate replacement for the eastern span of the Bay Bridge.

I look forward to hearing from you soon.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

May 20, 1999

IN REPLY REFER TO

Ms. Annemarie Conroy
Executive Director, Treasure Island Project
410 Avenue of the Palms
Building 1, 2nd Floor, Treasure Island
San Francisco, CA 94130

Dear Ms. Conroy:

SUBJECT: SAN FRANCISCO/OAKLAND BAY BRIDGE

Thank you for your March 9, 1999, comments concerning the notes that we provided for the January 27, 1999, meeting of the Council of Environmental Quality (CEQ) in Washington D.C. As a point of clarification, the notes for that meeting were in response to the CEQ's request for FHWA to meet with the agencies affected by this project, and to provide a report to the CEQ on the technical issues and impacts of the Southern Alignment being prepared by the City of San Francisco. To accomplish this goal, FHWA met with the Port of Oakland on January 13, 1999, East Bay Metropolitan Utility District (EBMUD) on January 22, 1999, the City and County of San Francisco and the Navy on January 22, 1999, and the U.S. Coast Guard (USCG) on January 22, 1999. FHWA was not able to meet with the Regional Parks District prior to the CEQ meeting.

The notes specifically identify the impacts of a southern alignment on the U.S. Coast Guard, the Port of Oakland, the East Bay Municipal District, the East Bay Regional Park District, the City and County of San Francisco and the U.S. Navy. Because the CEQ request was for only the impacts of a southern alignment, the notes did not mention nor address the impacts of a northern alignment which are fully described in the Draft Environmental Impact Statement for this project.

You referenced a letter from EBMUD which was not attached as you indicated. Nevertheless, our notes to the CEQ reflected EBMUD's concerns voiced during our discussion with them as well as those contained in the enclosed January 25, 1999, EBMUD letter to Mr. Jeffrey Lindley, which was copied to Ms. Joan Rummelsburg of your staff. Our notes did not indicate that EBMUD had an alignment preference, but reflected some of the criteria which must be met before

they would support a southern alignment. The EBMUD further stated that this list is not all inclusive.

During our discussions with EBMUD, they indicated that the cost of protecting their outfall is estimated in the tens of millions, assuming that it is possible at all. In addition, the capability and potential costs to indemnify the outfall during construction are unknown but can be expected to increase the cost of the project significantly more than the $3 million estimated by the City of San Francisco.

After discussing EBMUD's concerns with Caltrans, we believe that the criteria for a seismic analysis to determine the minimum separation distance from the outfall to the bridge will be extremely difficult to meet with the modified S-1 alignment. This is because the modified S-1 alignment is directly above the outfall and the proposed bridge foundations are very close to the outfall, resulting in potential damage to either the bridge foundations, the outfall, or both during a seismic event.

During our January 22, 1999, meeting with your staff, the Navy, and your traffic engineering consultant, it was apparent that your consultant had conducted only very preliminary studies and estimates concerning this very complex engineering project. We are aware that your staff has met with various parties in an effort to gain support for the proposed modified S-1 alignment. Likewise, the EBMUD, Regional Parks District, Port of Oakland, USCG, the City of Oakland, the City and County of San Francisco, as well as others have been intimately involved in this project throughout the Metropolitan Transportation Commission (MTC) process.

You indicated that we omitted statements by Mr. Parsons concerning impacts of the N-6 alignment on the historical properties on Yerba Buena Island (YBI). As requested by the CEQ, our comments were only directed to the impacts of the Southern Alignment being proposed by the City of San Francisco, therefore any references or comments concerning the N-6 or N-2 alignments were omitted, as they are fully described in the Draft Environmental Impact Statement for this project.

You referenced and provided a February 23, 1999, letter from the Port of Oakland. It is noted that this letter was generated after the date of our notes to the CEQ. Nevertheless, after reviewing the Port of Oakland's letter, the Port of Oakland continues to be concerned that the range of "Southern Alignment" alternatives preclude development of portions of this proposed terminal, to the disadvantage of both the Port of Oakland and the future economic well-being of the region. While the Port of Oakland indicated that the San Francisco proposal has less potential adverse impact on the Port than the alternative southern alignments presented by Caltrans, the impacts of the San Francisco proposal are still greater than the impacts of the northern alternatives. The Port of Oakland stated, in summary, that building the bridge on any of the northern alignments (or at least north of the existing alignment) will have little impact on the Port of Oakland's plans and operations. The Port of Oakland further stated that in addition, the northern alignments appear to provide more flexibility by which to design a potential gateway feature.

As the lead Federal Agency on this project, we are concerned with all of the impacts of this proposed project to the natural and human environment. In addition, this project is of utmost importance in providing a safe and viable major lifeline structure to and from the City of San Francisco during a seismic event. We will continue to work toward a consensus at the local and regional levels to advance and expedite this extremely important project.

Sincerely,

/s/ Robert F. Tally Jr.

For
Jeffrey A. Lindley
Division Administrator

Enclosure

cc:
Allen Hendrix, CT Hqs
Henry Yahata, CT Dist 04
Rear Admiral John L. Parker, USCG
Ray Clark, Council on Environmental Quality
Captain Ernest Hunter, US Navy
Fred Skaer, FHWA HQ, Office of National Environmental, Policy Act Facilitation

DEPARTMENT OF THE NAVY
THE ASSISTANT SECRETARY OF THE NAVY
(INSTALLATIONS AND ENVIRONMENT)
1000 NAVY PENTAGON
WASHINGTON, D.C. 20350-1000

June 3, 1999

The Honorable Gray Davis
Governor of the State of California
State Capitol
Sacramento, CA 95814

Dear Governor Davis:

I am writing concerning the California Department of Transportation's (CALTRANS) proposed San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. In particular, I want to address the Department of the Navy's (Navy) concerns about the Project.

Recent news reports concerning the Project suggest that you have directed CALTRANS to proceed with completion of the design of a replacement span that would be located north of the existing bridge and to forego further consideration of either a retrofit of the existing bridge or a southern alignment for the replacement span. I trust that these news reports do not provide a complete and accurate picture and that this matter remains open for consideration.

Yerba Buena Island, upon which any proposed new San Francisco-Oakland Bay Bridge would be anchored, is property owned by the United States of America. The Department of the Navy and the United States Coast Guard are the executive agencies responsible for Yerba Buena Island. Navy is responsible for most of the property on the island. Thus, any alignment will require access to Navy property.

The Navy property on Yerba Buena Island is part of Naval Station Treasure Island and falls within the city limits of the City of San Francisco. The City of San Francisco is the Local Redevelopment Authority recognized by the Department of Defense as the entity responsible for planning the redevelopment of Naval Station Treasure Island.

In Section 2901 of the National Defense Authorization Act for Fiscal Year 1994, Public Law 103-160, Congress recognized the economic hardship occasioned by base closures, the Federal interest in facilitating economic recovery of base closure communities, and the need to identify and implement redevelopment of property at closed military installations. In Section 2903(c)

of Public Law 103-160, Congress directed the Military Departments to consider each base closure community's economic needs and priorities in the property disposal process. Under Section 2905(b)(2)(E) of the Defense Base Closure and Realignment Act of 1990, Navy must consult with local communities before it disposes of base closure property and must consider local plans developed for reuse of the surplus Federal property.

The Department of Defense's goal, as set forth in Section 174.4 of the Department of Defense Rule on Revitalizing Base Closure Communities and Community Assistance, 32 CFR Parts 174 and 175, is to help base closure communities achieve rapid economic recovery through expeditious reuse of the assets at closed bases, taking into consideration local market conditions and locally developed reuse plans.

Navy has been working with the City of San Francisco since 1993 to support and assist the City in preparing a Reuse Plan for Naval Station Treasure Island, including the Navy property on Yerba Buena Island. In addition, Navy and the City of San Francisco are preparing a Joint Environmental Impact Statement/Environmental Impact Report pursuant to the National Environmental Policy Act of 1969 (NEPA) and the California Environmental Quality Act (CEQA).

Under NEPA and CEQA, Navy and the City must consider and evaluate various alternative uses for the property, including the City's proposed Reuse Plan, and address the effects of disposal and reuse of the property on protected resources such as the Admiral Nimitz House (Quarters 1), the adjacent Historic District which includes six additional Victorian homes often known as the "Great Whites" and related buildings and grounds, and the Torpedo Factory which is the oldest building on Yerba Buena Island.

Navy has not yet completed its analysis under NEPA for the disposal and reuse of Naval Station Treasure Island. Additionally, as long as the Department of the Navy holds title to the property, Navy's permission is required to implement any new bridge alignment. Indeed, because the acquisition of Navy-owned property is an essential element of the proposed project, Navy should have a significant role in analyzing the bridge alternatives and in selecting a preferred alternative.

In my letter of November 23, 1998, Navy submitted comments to CALTRANS and the Federal Highway Administration (FHWA) regarding the adequacy of the joint Draft Environmental Impact Statement (DEIS) for the Proposed San Francisco-Oakland Bay Bridge East Span Seismic Safety Project and presented objections to the proposed northern alignment. I have enclosed a copy of

that letter for your review. Navy was not alone in objecting to the northern alignment or in expressing concern about the adequacy of the DEIS. The United States Environmental Protection Agency (EPA) and the City of San Francisco, among others, questioned the adequacy of the document. EPA rated the DEIS a "3 - Inadequate Information," concluding that the DEIS did not satisfy the purposes of NEPA. A rating of "3" means that the document should be formally revised and made available for public comment in a supplemental or revised DEIS.

In spite of EPA's rating, CALTRANS announced that the northern alignment, previously selected by the Metropolitan Transportation Commission without the benefit of any environmental documentation, would be the preferred alternative. This decision was announced before CALTRANS issued any supplemental or revised DEIS that responded to public comments on the DEIS. Furthermore, CALTRANS apparently does not intend to circulate a supplemental or revised DEIS, but rather intends to proceed directly to a Final Environmental Impact Statement (FEIS). CALTRANS is proceeding with the design of a northern alignment in spite of Navy's objections.

The Department of the Navy is supportive of California's efforts to make bridges in the State seismically safe. In fact, we are cooperating with CALTRANS on a full retrofit of the West Span of the San Francisco-Oakland Bay Bridge and both of its Yerba Buena Island tunnel entrances. We are also cooperating with CALTRANS on an interim seismic retrofit of the East Span of that bridge. Navy made additional land available to CALTRANS for the interim retrofit in November 1997, and this project has produced considerable adverse construction-related impacts on the eastern end of Yerba Buena Island. Navy would support a full retrofit of the bridge or a southern alignment that minimizes impacts on historic facilities, minimizes construction-related impacts, and supports economic redevelopment of Yerba Buena Island.

The proposed bridge replacement project is an enormous undertaking with substantial impacts both during and after construction. However, CALTRANS' DEIS did not adequately consider and treat the substantial adverse impacts of its proposed northern alignment on the environmental and historic resources on Yerba Buena Island or on the City of San Francisco's ability to redevelop the island in accordance with its Reuse Plan. The DEIS also did not adequately address the construction impacts to Yerba Buena Island, the Oakland touchdown area or the adjacent wetlands. Most importantly, the DEIS did not adequately consider all reasonable alternatives and did not consider any reasonable southern alignment that would have minimal adverse impacts on Yerba Buena Island.

The historic structures on Yerba Buena Island are an important part of our Nation's Naval heritage that should be preserved and protected. The proposed northern alignments of the bridge would connect it to Yerba Buena Island in a manner that places the bridge directly over or immediately adjacent to several historic structures of national importance and to ecologically sensitive areas. Thus, we object to any alignment that would adversely impact the Historic District, these structures, and the adjacent ecologically sensitive areas.

In accordance with Section 106 of the National Historic Preservation Act, CALTRANS circulated a draft Memorandum Of Agreement (MOA) concerning the historic structures on Yerba Buena Island. Navy considers this document to be inadequate, and as the owner of the property, will not execute this or any other MOA for the northern alignment as long as there are other alternatives that have minimal impact on the irreplaceable historic resources on Yerba Buena Island.

The Department of Defense is committed to assisting base closure communities with economic redevelopment of closed bases such as Naval Station Treasure Island. Thus, Navy also opposes the northern alignment because it would prevent the Local Redevelopment Authority from redeveloping this property in a manner that benefits the local economy. The northern alignment would physically dominate and render useless most of the developable land on Yerba Buena Island that the City of San Francisco plans to redevelop. The northern alignment also impedes Navy's ability to dispose of the property on Yerba Buena Island by substantially limiting its utility and reuse potential for private sector activities by removing land from the most developable area. It would leave Navy with property that would be adversely affected by the shadow from the bridge, by noise and vibration, and by poor traffic flow.

As you know, the City of San Francisco engaged a highly respected structural engineering firm, JMI Incorporated, to review the proposed northern alignment and to develop an alignment responsive to the concerns of the City, the Navy, the Coast Guard and stakeholders in the East Bay. The East Bay stakeholders include the Port of Oakland, the East Bay Municipal Utilities District (EBMUD), and the City of Oakland. The City's consultants concluded that if the alignment is changed now, CALTRANS' construction schedule would be minimally affected. In fact, the current schedule calling for completion of design by the end of 2000 could be maintained. Equally important, the City's consultant concluded that constructing a bridge in the southern alignment would save Californians nearly $58 million, even including the added expense of safely straddling the EBMUD

sewage outfall and siting the main tower off Yerba Buena Island in deeper water.

The proposed construction of a new Woodrow Wilson Bridge here in the Washington area recently resulted in a NEPA-based decision against the Federal Highway Administration for failure adequately to consider alternatives to the one selected by that Federal agency. The arguments advanced by the plaintiffs in this case are similar to those advanced by parties who have objected to CALTRANS' selection of the northern alignment. In fact, the Federal District Court concluded that the FHWA did not adequately consider an alternative to its selected design; did not adequately consider construction-related impacts; and failed to comply with Section 106 of the National Historic Preservation Act. The Court ordered that construction of the new bridge could not commence until the agency fulfilled its obligations under the relevant statutes. This decision is captioned City of Alexandria v. Rodney E. Slater, U.S. Department of Transportation, et al., United States District Court for the District of Columbia, Civil Action No. 98-0251 (SS), dated April 13, 1999. It illustrates the validity of the objections that we and others have raised to CALTRANS' consideration of only a northern alignment and to CALTRANS' failure to consider the impacts of this alignment on protected resources and the redevelopment of Yerba Buena Island.

Navy wants to work with the State of California to facilitate construction of a seismically safe East Span that preserves and protects environmental and historic resources and supports the City of San Francisco's redevelopment plans. There are at least two reasonable alternatives that have substantially less adverse impacts. Thus, I ask you to consider a retrofit of the existing bridge or the construction of a southern alignment.

I appreciate your consideration of Navy's concerns. If I may provide any additional information, please let me know.

Sincerely,

ROBERT B. PIRIE, JR.

Enclosure

CITY OF OAKLAND

CITY HALL • 1 FRANK H. OGAWA PLAZA • OAKLAND, CALIFORNIA 94612

IGNACIO De La FUENTE
President of the City Council

510 / 238-7005
FAX / 238-6910
TDD / 238-7413

June 10, 1999

Supervisor Mary King
Metropolitan Transportation Commission
Joseph P. Bort Metro Center
101 Eighth Street
Oakland, CA 94607-1700

Dear Supervisor King:

The City Council continues to advocate for a replacement bridge that ensures the safety of our citizens, is aesthetically world class, and meets our long-term transportation needs. Specifically, we endorse:

1. A northern alignment designed to maximize the open space area adjacent to the Oakland anchorage.
2. Appropriate provisions for local hiring and contracting goals.
3. A gateway and park at the anchorage in Oakland.
4. A world-class, aesthetic design (assuming that the design process is re-opened and it does not cause undue delay).
5. A study of long-term passenger rail options between Oakland and San Francisco and provisions for rail built into the new eastern span bridge structure.
6. A bicycle/pedestrian path from Oakland to San Francisco.

If you need further clarification, please contact me at (510) 238-7005.

Sincerely,

IGNACIO DE LA FUENTE
Council President

cc: Bay Bridge Design Task Force
Steve Heminger, MTC
Denis Mulligan, Caltrans
Brian Marony, Caltrans
Claudette Ford, PWA

P 23153

B.

U.S. Department of Transportation
United States Coast Guard

Commander
Maintenance & Logistics
Command Pacific

Coast Guard Island, Bldg 54D
Alameda, CA 94501-5100
Staff Symbol: s
Phone: (510) 437-5941
FAX: (510) 437-5753

11011
JUN 22 1999

Mr. Jeffery A. Lindley
Divisional Administrator
California Division, Federal Highway Administration
980 Ninth Street, Suite 400
Sacramento, California 95814-2724

Dear Mr. Lindley:

You were kind enough recently to provide us with a copy of Mayor Brown's 10 May memorandum to Secretary Slater in which he draws a parallel between the ongoing Oakland Bay bridge debate and a case involving the Woodrow Wilson bridge in Alexandria. While the Virginia case and your analysis of it does not bear upon the Coast Guard's operations at this moment, I am troubled that Mayor Brown's letter, along with a number of other communications coming from the City of San Francisco, trivialize both the nature of Coast Guard operations on Yerba Buena Island and the impact of bridge construction on our missions. Mayor Brown's 10 May letter implies that the impact to the Coast Guard involves a mere 1.5 acres and assumes a simple effort to relocate a 72 person barracks to other Coast Guard owned land. In other venues, city representatives have referred to the Coast Guard interest as *an argument over a tennis court* or, an issue *over noise during construction*. Obviously, it's not that simple and we are concerned that unchecked, these characterizations will be perceived as truth if conveyed to the Secretary in an unbalanced way. Accordingly, I want to take this opportunity to review with you the significant impact bridge construction will have on the Coast Guard and I hope that you will be willing to articulate our concerns within FHWA as you move toward a Record of Decision on the Oakland Bay Bridge project.

As you are doubtlessly aware, all major Coast Guard missions including coordination of search & rescue operations, marine safety, vessel traffic management, aids to navigation and communications – nearly every operational function in the Coast Guard inventory save aviation - are centered on our Yerba Buena Island (YBI) facility. Our Group San Francisco command on YBI controls operations & communications throughout the Bay area with responsibilities extending from Monterey in the south to Bodega Bay in the north and as far east as Lake Tahoe. The Coast Guard Vessel Traffic Service center on the Island is essential to the safe passage of large, ocean going ships and is a critical factor in the protection of the Bay's marine environment. Our base is the point from which Bay Area search and rescue craft and larger multipurpose vessels are dispatched daily. Our facilities include a significant industrial function which has responsibility for maintenance and repair of boats and aids to navigation. Operation of this facility requires daily accessibility by large delivery vehicles carrying supplies, parts, food and fuel. Our YBI facilities provide government housing for over 80 Coast Guard members and their families (from bachelor enlisted members to senior officers). A total of 219 Coast Guard active duty and civilian members work on YBI facility every day.

While the permanent footprint of the new bridge structure on Coast Guard property will be relatively small, we have been advised by CALTRANS that even under the least intrusive option (northerly alignment), approximately 3.5 acres of Coast Guard property will be fully engaged as a construction site complete with large excavations and erection of temporary structures. This represents nearly 20 percent of our usable property. In the event the City is successful in preventing other parts of the island from being used for staging of construction material and equipment, then the Coast Guard property stands to be impacted even more. Contrary to the mayor's apparent belief, we have no ability in the short run to create

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JUN 22 1999

alternative docks, shops, living quarters or electronics infrastructure as about 55 percent of Coast Guard land is hillside real estate, with gradients frequently exceeding 45 degrees.

I want to leave you in no doubt that the Coast Guard fully supports the project put forth by the State of California to construct the new eastern span of the Bay Bridge. We are prepared to partner with any and all agencies and interests to ensure that work gets underway as soon as possible and that it proceeds as expeditiously as possible. I do not, however, support the argument that the potential future value of an abandoned Naval base automatically exceeds that of our adjacent actively utilized facility. Any significant compromise to the Coast Guard's ability to operate from Yerba Buena Island affects the safety and transportation needs of the citizens of the Bay area and specifically impairs our ability to support our public safety missions in this region.

I appreciate the effort you and your staff have put into the evaluation of the new eastern span of the Bay Bridge and I particularly appreciate the fact that you have consulted extensively with all parties involved in this action. I hope that as the lead Federal agency on this project you will ensure that the Coast Guard interests are given fair and accurate representation as this project is discussed within the Department.

Sincerely,

JOHN L. PARKER
Rear Admiral, U.S. Coast Guard
Commander, Maintenance &
Logistics Command Pacific

Copy: COMDT (G-CRC), (G-S), (G-O), (G-I)
Commander, Pacific Area (P), (Pcs)
Commander, Coast Guard Group San Francisco
Commanding Officer, Coast Guard Vessel Traffic Service San Francisco

METROPOLITAN TRANSPORTATION COMMISSION

101 Eighth Street
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RECEIVED
JUN 25 1999
B. QUAN

June 23, 1999

The Honorable Ignacio De La Fuente
President of the City Council
City Hall
1 Frank H. Ogawa Plaza
Oakland, CA 94612

Dear President De La Fuente: Ignacio

Thank you for your letter of June 10, 1999 restating the Oakland City Council's position with respect to the new eastern span of the San Francisco-Oakland Bay Bridge. I would like to respond briefly to the six points outlined in your letter.

1. Northern alignment - MTC has recommended the northern alignment for the new bridge which, as you note, is clearly superior from the City and Port of Oakland's point of view.

2. Local hiring - As you know, Caltrans will control the contracting and construction process for the new span, but I share the Council's concerns about local hiring and have already begun a dialogue with Caltrans on this issue. In addition to local hiring, we should jointly pursue training programs to ensure that our residents have the appropriate skills to fill these high-paying construction jobs.

3. Gateway Park - MTC fully shares the Council's objective of establishing a beautiful Gateway Park to the south of the Oakland touchdown for the new bridge. In fact, MTC's FY 1999-2000 agency budget includes $120,000 earmarked for this project which will help finance the first year of planning activity by the East Bay Regional Park District necessary to design and build the park.

4. Bridge design - Although there are certainly many differing opinions about the aesthetics of the current design, I believe it is too late to re-open the design process to other alternatives. Re-opening the design selection process would significantly delay construction of a seismically safe new span without any guarantee that whatever new bridge design might emerge from the process would be more aesthetically pleasing than the current choice. I assure you, moreover, that MTC will continue to strive for improvement and refinement of the current design plans to the extent feasible.

5. Passenger rail study - In response to the ballot measures approved in Oakland and three other cities, MTC has commenced a $325,000 consultant study of different passenger rail alternatives for the Bay Bridge. The study is expected to conclude by December 1999. As you also know, the MTC-recommended design for the new eastern span could accommodate light rail service at a future date if funding were to become available.

6. Bicycle/pedestrian path - The new eastern span design recommended by MTC includes a bicycle/pedestrian path from Oakland to Yerba Buena Island. In addition, MTC's Bay Area Toll Authority budget for FY 1999-2000 includes funding for a $2 million engineering analysis to be conducted by Caltrans that will explore the feasibility of attaching a bicycle/pedestrian path to the existing western span from the island to San Francisco.

In conclusion, I believe that MTC has been a strong advocate for the City of Oakland's concerns about the new eastern span of the Bay Bridge, and that the time has come for all parties to put aside any remaining differences so that this project so critical to the safety of our constituents and the region's economic vitality may proceed to construction. I value the City Council's active involvement in the bridge design process to date, and I need your continued assistance to see this task through to a prompt conclusion.

Sincerely,

Mary V. King
Chair
Bay Bridge Design Task Force

cc: Members, Bay Bridge Design Task Force
Harry Yahata, Caltrans

c:HYY, HPH, MAROONEY, HULSEBUS, BAYOL, ADE, MARA, MARILEE, RACHEL

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

TREASURE ISLAND PROJECT
410 AVENUE OF THE PALMS
BUILDING 1, 2ND FLOOR
TREASURE ISLAND
SAN FRANCISCO, CA 94130
(415) 274-0660
FAX (415) 274-0299

July 13, 1999

BY OVERNIGHT DELIVERY

Ms. Maria Contreras-Sweet
Secretary
Business, Transportation, Housing Agency
980 Ninth Street, Suite 2450
Sacramento, CA 95814-2719

Dear Secretary Contreras-Sweet:

Thank you so much for giving us the opportunity last week to present the City and County of San Francisco's position on Caltrans' proposed plans to replace the East Span of the San Francisco-Oakland Bay Bridge. After almost 18 months, I am hopeful that our perspective has been finally understood and acknowledged and look forward to working with you and Mr. Gutierrez in addressing San Francisco's concerns in a way which will benefit all Californians

We were thoroughly disheartened on July 6th, just days after our meeting with you, when Mr. Mulligan, representing Caltrans at a public meeting, stated that the Governor was intervening with the Navy regarding the Northern alignment. It was as if our meeting never took place As you could sense from the meeting, much of the frustration of the City of San Francisco rests with Caltrans' representatives and their continuing stonewalling and ignoring true legal and environmental issues presented by the N-6 alignment. Yesterday's *San Francisco Chronicle* article (attached) is further evidence that Caltrans wishes to perpetuate its campaign of maligning persons and agencies which have clearly identified significant legal and environmental issues presented by their choice of the N-6 alignment. This behavior is not conducive to a civil and productive discussion to bring about consensus from the current and future property owners. These same entities are essential to the construction of the bridge on either alignment, as the US Navy owns the entire YBI peninsula, which is also future City property.

As to the content of the referenced article, the delays in the project are due to the arrogance of Caltrans by ignoring the property owner and currently having no site to anchor this $1 6 billion bridge project. **To continue down a failed path with no legal rights to the property on the Northern alignment is a waste of taxpayer money and is an insult to the people of the Bay Area**. The property owner is willing to provide the anchor for the bridge to the South. Thus, this should be the appropriate alignment The delays are also caused by

Caltrans in their total disregard for the environmental process, causing the EPA to force changes in the process to protect the San Francisco Bay It was Caltrans' refusal to heed the advice of the EPA and their refusal to comport with basic EPA requirements that has caused the delay in issuing the Record of Decision. **Today's article is yet another indication of the way in which Caltrans representatives continue to vilify others for their failures**

In addition, as we made clear in our meeting, the City of San Francisco is not posturing for mitigation. A "pay off" of $25 million as referenced in the article is not acceptable. The City stands by its position that the only appropriate mitigation, among other things, is the modified S-1 alignment.

I have enclosed another copy of the material we presented to you last week as well as Judge Sporkin's recent decision halting work on the Woodrow Wilson Bridge in Virginia The City and County of San Francisco remains firmly opposed to the Northern alignment and given the enduring opposition of the United States Navy to that alignment, respectfully urges Governor Davis and the Secretary to give strong consideration to the modified S-1 alignment

I visited with Navy Secretary Cassidy on Thursday of last week and reported to him on our meeting. The position of the US Navy remains the same

The City's position is summarized below:

1 The U.S Navy has repeatedly and strongly indicated that it objects to construction of the new East Span on the Northern alignment because such construction will irretrievably damage historic buildings on Yerba Buena Island (YBI), including the Nimitz House. The alignment will also destroy most, if not all, redevelopment potential for the YBI peninsula Such damage will reduce the value of YBI in the conveyance process I have enclosed a copy of the latest letter (June 3, 1999) that Navy Secretary Pirie sent to Governor Davis. As you know, the Navy has refused to permit Caltrans to perform geotechnical explorations on the island. The Navy has agreed to allow the modified S-1 alignment to occur, requiring less taking of YBI property, although still requiring Navy (and future City) property

2. Due to state Tidelands Trust restrictions on Treasure Island (which do not apply to YBI, a natural island) and costly repairs to aging infrastructure on Treasure Island, the City is dependent primarily on Yerba Buena Island to generate revenue from existing and future development on YBI. If the Northern alignment were built, revenue from the historic structures and other planned developments such as live/work studios, a restaurant in the existing Torpedo Factory and a conference center would be drastically reduced. Beautiful established recreation space would also be forever lost to Bay Area residents Construction of temporary ramps to the bridge and temporary detours will exacerbate the loss during a minimum 60 months of construction The YBI peninsula and significant portions of this beautiful island will be destroyed under Caltrans' current construction and staging plans.

3. The losses to the City are enormous. The loss to the City and County of San Francisco in **reduced land sale value alone is $25 million**. The loss of rental income, transient occupancy and property taxes as well as the loss of full time jobs exceeds $10 million during a five year

construction period and **losses exceed $94 million over 30 years for the Treasure Island Project**. **Loss of movie industry spending to the City of San Francisco will exceed $200 million over the five-year construction period**. Such losses reduce the attractiveness of the islands for a master developer and the movie industry, cast a pall over the development of the marina on Treasure Island, **jeopardizing a $12 million investment opportunity**, as well as the long term redevelopment opportunities for the City. Enclosed is a copy of a report by the Sedway Group analyzing the impact of the Northern alignment on YBI

4. Construction of the N-6 alignment has already been delayed due to Caltrans' failure to follow the requirements of the EPA and their failure to secure a YBI landing to anchor the bridge. Further delays are inevitable with impending challenges to the EIS which received a "3" rating from the EPA, its lowest rating. Delay will also result **from litigation from San Francisco exposing the serious violations of NEPA and the failure to comport with NEPA requirements to study all reasonable alternatives and identify all construction impacts**. Similarly, the behavior of MTC and Caltrans officials in attacking persons who dared to speak out against or ask questions about the wisdom of the N-6 alignment were vilified in the press as jeopardizing lives, **casting a chill on public comment** both at MTC during the selection process for the alignment as well as during the public comment period for the environmental document. Litigation and protests are certain with the N-6 with regard to the construction of the span in the East Bay mudflats, an established conservation area. Other sources of delay include the documented unwillingness of the U.S. Navy to sign a Memorandum of Agreement (MOA) with respect to the preservation of historic structures. **Without the MOA from the property owner, the ROD cannot be issued. Thus, without the ROD, no project can begin**

5. In April of this year, Judge Stanley Sporkin issued a decision effectively halting construction of a twelve lane span, the Woodrow Wilson Bridge, across the Potomac River near Washington, D.C. The proposed Woodrow Wilson Bridge and Caltrans' proposed replacement for the East Span have several common elements. Judge Sporkin found that the Federal Highway Administration (FHWA) failed to analyze all reasonable alternatives, similar to Caltrans' premature rejection of the S-1 alternative. Just as important, FHWA failed to complete its identification and protection of protected properties under the National Historic Preservation Act in that the new bridge dominated and overpowered the historic district and also failed to recognize all construction impacts. The Court found that FHWA had abused its discretion in issuing the ROD as all elements of NEPA and the National Historic Preservation Act had not been satisfied. **The City believes this recent opinion should give FHWA and Caltrans pause in spending more resources on the N-6 and the EIS when there are such enormous NEPA problems with the document**

6. Caltrans carelessly discarded the S-1 alternative in its selection of viable alignments. After repeated attempts by the City to garner written information, studies, memos or decision making tools from Caltrans as to how the decision to jettison the S-1 alignment was made, we have discovered that **no such responsible and thorough investigation was made prior to jettisoning the S-1 from study**. The agency based its decision on the EBMUD outfall and the alleged peril in constructing a bridge nearby. As is noted below, the City's consultants emphasized that such work can be safely accomplished with adequate safeguards that can be easily put into place. Thus, Caltrans has left itself open to legal challenge for its failure to

analyze all reasonable alternatives. After our meeting in Sacramento, Mr. Mulligan reluctantly admitted that the S-1 alignment was viable and could be constructed Likewise, the senior engineer who was also present admitted that the outfall did not present a fatal flaw to the S-1 alignment and that it could be accomplished.

7. **Adopting the modified S-1 alignment will remove obstacles to the timely replacement of the East Span.** Unlike the N-6 alignment, which is fraught with hopeless legal challenges, environmental issues and no property on which to construct the anchorage, **the modified S-1 furnishes an anchor for the bridge on YBI acceptable to the Navy, the habitat conservation area at the eastern touchdown area would be preserved and legal challenges from San Francisco to the EIS would be avoided**. Moreover, with the span's increased distance from historic structures, **the U.S. Navy would be more likely to sign the MOA with Caltrans, thus paving the way for the issuance of the ROD in a timely manner**. A gateway park at the eastern touchdown could be reconfigured to be a truly memorable, spectacular entry to the East Bay and the modified S-1 would have a minimal, if any, impact to future plans for the Port of Oakland.

8. When the City of San Francisco secured the services of consultants, Korve Engineering, to analyze the impacts of the Northern alignment and to determine if a southern alignment is feasible, the City consulted with the East Bay Municipal Utilities District, the Port of Oakland, the City of Oakland, the U S. Coast Guard, East Bay Parks District and the U S Navy to gain consensus on this critical Bay Area issue. Each of the aforementioned is willing to work with the City on a modified S-1 alignment. **The City is committed to ensuring that if the S-1 alignment is implemented, the considerations and interests of each of the entities will be addressed**. In the attached January 26, 1999 letter, Senators Dianne Feinstein and Barbara Boxer and Congressional Representatives George Miller, Nancy Pelosi and Ellen Tauscher stress the importance of obtaining a local consensus

9. Since the City desired to incorporate state-of-the-art structural analysis in determining the feasibility of a span along the southern alignment, we contracted **with JMI. International, a well-respected structural engineering firm** which has designed numerous bridges around the world. After significant review and the **findings of a $60,000 report**, the conclusions of JMI's study must be taken into account

- **If the alignment is changed now, the impact on Caltrans' schedule is minimal**
- **The current schedule can be maintained** for completion of design by the end of 2000.
- Further delay in relocating the alignment will only result in the expenditure of more at-risk design dollars.
- The time allocated by Caltrans to design the East Span greatly exceeds other spans of much shorter lengths That means that the already-scheduled extra time will permit Caltrans to adapt existing models to a Southern alignment.
- **Constructing a bridge on the Southern alignment will save taxpayers almost $58 million**
- The cost savings occur despite the added expense ($18,830,000) of relocating the main tower along the Southern alignment in deeper water and an additional amount

($2,862,000) to straddle the East Bay Municipal Utility District (EBMUD) sewer outfall

- **Relocation of the EBMUD outfall is unnecessary and needlessly expensive**
- A safe, commonly used option can easily accommodate the protection of the low-risk outfall in place for less than $3 million.

10. In addition, **the change in alignment would not require revisiting SB 60**. SB 60 was only a funding bill. It did not choose an alignment. It only references the Northern alignment in order to provide a cost estimate. SB 60 contains a budget for the East Span replacement with a 25% contingency and an additional 10% for "Ground Motion". For a project of this magnitude, the $40 million Caltrans alleges it has spent to date represents 7% of the $306 million contingency fund, leaving 93% or well over $250 million in the contingency fund at the 65% Design Phase. The at-risk money already spent accounts for 1 3% of the overall combined budget. Even with this in mind, the **JMI report finds that $60 million can still be saved despite Caltrans irresponsibly spending such large sums with known and absolute legal opposition to the N-6, no right to the property with which to anchor the N-6 alignment, and substantial legal deficiencies in the NEPA process leaving the impending ROD subject to legal challenge**.

We look forward to working with you and Caltrans towards a solution that truly benefits, rather than harms, all interested parties. The **City of San Francisco and the Treasure Island Project should not bear the brunt or the entire burden of the East Span replacement**. The S-1 alignment impacts significant acreage on YBI as well, however, on a permanent basis, will leave the Yerba Buena Island better suited for productive civilian reuse.

We understand the Governor has two concerns over this most important seismic safety project: cost and delay. The JMI report outlines the significant savings under the S-1 alignment - exceeding $60 million. The report also shows the time and design work which can be attained on the same schedule. The N-6 is hopelessly delayed (1) from litigation which is certain to find the ROD deficient in its obvious failure to follow NEPA requirements – similar to the situation involving the Woodrow Wilson Bridge and (2) from the fact that there is no property to anchor the N-6 alignment. The City of San Francisco has gone to great lengths and to great expense in developing the S-1 alternative. We feel we have paved the way for a smooth transition to the S-1, and with the S-1, an anchor for the East Span will be available from the US Navy and the City of San Francisco will not need to involve itself in protracted litigation which we are certain will end in a victory for the City under NEPA, **sending the entire project back to the drawing board**.

Madame Secretary, thank you for your time and attention the other day. As you know, the City is determined in its pursuit of the S-1 alignment that has minimal, if any, impact to the Port of Oakland. Our frustration with Caltrans representatives is obvious. We are being forced into a litigation we do not want to have to pursue, but we are left with no option. We have gone above and beyond what is required to help ease Caltrans into a choice of the S-1 alignment that works for everyone with no one agency bearing the entire brunt of the construction and permanent impacts of the East Span replacement project.

We appeal to your fairness and your "fresh eye" in looking at all of the issues presented. Given the recent article and the Caltrans representative's comments at meetings occurring after our discussion, we do not feel that there will be any benefit to dealing with the same personnel to reach an agreeable solution.

We look forward to working with you and your offices. It was a pleasure dealing with you and Mr. Gutierrez and to have such a warm reception for the City in your offices. It was greatly appreciated and I have passed along my report to the Mayor. This has been a very ugly situation.

In closing, further delay and litigation is a clear disservice to taxpayers and the motoring public. Let's join together to seek a solution that all can endorse.

Please call me at (415) 274-0660 if you should have any questions regarding our position. In the meantime, the City stands ready to collaborate with Governor Davis in any way possible.

Sincerely,

Annemarie Conroy
Executive Director

CC: Mayor Willie L. Brown, Jr.
Senator Diane Feinstein
Senator Barbara Boxer
Congresswoman Nancy Pelosi
Secretary Rodney Slater

Attachments.
Legal Opinion – Woodrow Wilson Bridge
JMI Report Commissioned by City of San Francisco
Binder of Support Materials – Impacts to City of San Francisco
Chronicle Article 7/12/99

U.S. Department of Transportation
United States Coast Guard

Commander (oan-2)
Eleventh Coast Guard District

Coast Guard Island
Alameda, CA 94501-5100
Staff Symbol: (oan-2)
Phone: (510) 437-3514
FAX: (510) 437-5836

16591
San Francisco Bay (8.9)
Ser: 480-99
August 26, 1999

Calvin C. Fong
Chief, Regulatory Branch
U.S. Army Corps of Engineers, San Francisco District
333 Market Street
San Francisco, CA 94105-2197

Dear Mr. Fong:

Mr. Jerry Olmes of my staff spoke with Rob Lawrence of your staff about access dredging during construction of the new San Francisco–Oakland Bay Bridge (SFOBB) East Span. Rob indicated that the U.S. Army Corps of Engineers (USACE) would permit the access dredging under Section 10 of the 1899 Rivers and Harbors Act, as amended, if requested to do so by the U.S. Coast Guard (USCG).

The USCG-USACE Memorandum of Agreement (MOA) (encl. 1) of 18 April 1973, outlines the functions of our respective agencies. Paragraph 1.B of the MOA vests USACE with jurisdiction over excavation and filling. Paragraph 4.A. further defines dredging and filling as a USACE function (unless they are integral features of a bridge and used in its construction). Authorization for excavation for the piers themselves (integral features) appears to be most appropriately covered in the bridge permit, whereas dredging for access does not appear to integral, since there are other ways to construct the span. Accordingly, I believe the USCG should permit construction of the bridge itself, including any pier excavations necessary to construct the bridge. I believe the USACE should permit dredging of access channels. Rob also asked for clarification of jurisdiction over falsework. Paragraph 5 of the MOA defines falsework used to construct the bridge as a matter under USCG jurisdiction.

Request your concurrence. As a practical matter, your expertise in dredging matters and your involvement with the Dredge Material Management Plan (DMMP), make your agency a more appropriate reviewing/permitting authority for dredged channels.

Sincerely,

W. R. TILL
Chief, Bridge Section
U. S. Coast Guard
By direction of the District Commander

Encl: (1) USCG-USACE MOA dated April 18, 1973

Copy: Mr. Denis Mulligan, CalTrans District 04, Oakland w/encl.

U.S. Coast Guard/Chief of Engineers

Memorandum of Agreement

1. Purpose and Authority:

A. The Department of Transportation Act, the Act of October 15, 1966, P.L. 89–670, transferred to and vested in the Secretary of Transportation certain functions, powers and duties previously vested in the Secretary of the Army and the Chief of Engineers. By delegation of authority from the Secretary of Transportation (49 CFR 1.46(c)) the Commandant, U.S. Coast Guard, has been authorized to exercise certain of these functions, powers and duties relating to bridges and causeways conferred by:

(1) the following provision of law relating generally to drawbridge operating regulations: Section 5 of the Act of August 18, 1894, as amended (28 Stat. 362; 33 U.S.C. 499);

(2) the following law relating generally to obstructive bridges; The Act of June 21, 1940, as amended (Truman–Hobbs Act)(54 Stat. 497; 33 U.S.C. 511 et seq.);

(3) the following laws and provisions of law to the extent that they relate generally to the location and clearances of bridges and causeways in the navigable waters of the United States:

(a) Section 9 of the Act of March 3, 1899, as amended (30 Stat. 1151; 33 U.S.C. 401);

(b) The Act of March 23, 1906, as amended (34 Stat. 84; 33 U.S.C. 491 et seq.); and

(c) The General Bridge Act of 1946, as amended (60 Stat. 847; 33 U.S.C. 525 et seq.) except Sections 502(c) and 503.

B. The Secretary of the Army and The Chief of Engineers continue to be vested with broad and important authorities and responsibilities with respect to navigable waters of the United States, including, but not limited to, jurisdiction over excavation and filling, design flood flows and construction of certain structures in such waters, and the prosecution of waterway improvement projects.

C. The purposes of this agreement are:

(1) To recognize the common and mutual interest of the Chief of Engineers and the Commandant, U.S. Coast Guard, in the orderly and efficient administration of their respective responsibilities under certain Federal statutes to regulate certain activities in navigable waters of the United States;

(2) To clarify the areas of jurisdiction and the responsibilities of the Corps of Engineers and the Coast Guard with respect to:

(a) the alteration of bridges

(1) in connection with Corps of Engineers waterway improvement projects, and

(2) under the Truman–Hobbs Act;

(b) the construction, operation and maintenance of bridges and causeways as distinguished from other types of structures over or in navigable waters of the United States;

(c) the closure of waterways and the restriction of passage through or under bridges in connection with their construction, operation, maintenance and removal; and

(d) the selection of an appropriate design flood flow for flood hazard analysis of any proposed water opening.

(3) To provide for coordination and consultation on projects and activities in or affecting the navigable waters of the United States.

In furtherance of the above purposes the undersigned do agree upon the definitions, policies and procedures set forth below.

2. Alteration of Bridges in or Across Navigable Waters Within Corps of Engineers Projects:

A. The Chief of Engineers agrees to advise and consult with the Commandant on navigation projects contemplated by the Corps of Engineers which require the alteration of bridges across the waterways involved in such projects. The Chief of Engineers also agrees to incude in such project proposals the costs of alterations, exclusive of betterments, of all bridges within the limits of the designated project which after consultation with the Commandant he determines to require alteration to meet the needs of existing and prospective navigation. Under this concept the federal costs would be furnished under the project.

B. The Commandant of the Coast Guard agrees to undertake all actions and assumes all responsibilities essential to the determination of navigational requirements for horizontal and vertical clearances of bridges across navigable waters necessary in connection with any navigation project by the Chief of Engineers. Further, the Commadant agrees to conduct all public proceeding necessary thereto and establish guide clearance criteria where needed for the project objectives.

3. Alteration of Bridges Under the Truman–Hobbs Act:

The Commandant of the Coast Guard acknowledges and affirms the responsibility of the Coast Guard, under the Truman–Hobbs Act, to program and fund for the alteration of bridges which, as distinct from project related alterations described in paragraph 2 herein, become unreasonable obstructions to navigation as a result of factors or changes in the character of navigation and this agreement shall in no way affect, impair or modify the powers of duties conferred by that Act.

4. Approval, Alteration and Removal of Other Bridges and Causeways:

A. General, Definitions. For purposes of this Agreement and the administration of the statutes cited in 1.A.(3) above, a "bridge" is any structure over, on or in the navigable waters of the United States which (1) is used for the passage or conveyance of persons, vehicles, commodities and other physical matter and (2) is constructed in such a manner that either the horizontal or vertical clearance, or both, may affect the

passage of vessels or boats through or under the structure. This definition includes, but is not limited to, highway bridges, railroad bridges, foot bridges, aqueducts, aerial tramways and conveyors, overhead pipelines and similar structures of like function together with their approaches, fenders, pier protection systems, appurtenances and foundations. This definition does not include aerial power transmission lines, tunnels, submerged pipelines and cables, dams, dikes, dredging and filling in, wharves, piers, breakwaters, bulkheads, jetties and similar structures and works (except as they may be integral features of a bridge and used in its construction, maintenance, operation or removal; or except when they are affixed to the bridge and will have an effect on the clearance provided by the bridge) over which jurisdiction remains with the Department of the Army and the Corps of Engineers under Sections 9 and 10 of the Act of March 3, 1899, as amended (33 U.S.C. 401 and 403). A "causeway" on both sides of the road, and which is constructed in or affects navigation, navigable waters and design flood flows.

B. Combined Structures and Appurtenances. For purposes of the Acts cited in 1.A.(3) above, a structure serving more than one purpose and having characteristics of either a bridge or causeway, as defined in 4.A., and some other structure, shall be considered as bridge or causeway when the structure in its entirety, including its appurtenances and incidental features, has or retains the predominant characteristics and purpose of a bridge or causeway. A structure shall not be considered a bridge or causeway when its primary and predominant characteristics and purpose are other than those set forth above and it meets the general definitions above only in a narrow technical sense as a result on incidental features. This interpretation is intended to minimize the number of instances which will require an applicant for a single project to secure a permit or series of permits from both the Department of Transportation and the Department of the Army for each separate feature or detail of the project when it serves, incidentally to its primary purpose, more than one purpose and has features of either a bridge or causeway and features of some other structure. However, if parts of the project are separable and can be fairly and reasonably characterized or classified in an engieering sense as separate structures, each such structure will be so treated and considered for approval by the agency having jurisdiction thereover.

C. Alteration of the Character of Bridges and Causeways. The jurisdiction of the Secretary of Transportation and the Coast Guard over bridges and causeways includes authority to approve the removal of such structures then the owners thereof desire to discontinue their use. If the owner of a bridge or causeway discontinues its use and wishes to remove or alter any part thereof in such a manner that it will lose its character a bridge or causeway, the Coast Guard will normally require removal of the structure from the waterway in its entirety. However, if the owner of a bridge or a causeway wishes to retain it in whole or in part for use other than for operation and maintenance as a bridge or causeway, the proposed structure will be considered as coming within the jurisdiction of the Corps of Enginers. The Coast Guard will refer requests for such uses to the Corp of Engineers for consideration. The Corps of Engineers agrees to advise the Commandant of the receipt of an application for approval of the conversion of a bridge or causeway to annther structure, no residual jurisdiction over the structure will remain with the Coast Guard. However, if the Corps of Engineers does not approve the proposed conversion, then the structure remains a bridge subject to the jurisdiction of the Coast Guard.

5. Closure of Waterways and Restriction of Passage through or under Bridges:

Under the statutes cited in Section 1 of this Memorandum of Agreement, the Commandant must approve the clearances to be made avaiable for navigation through

or under bridges. It is understood that this duty and authority extends to and may be exercised in connection with the construction, alteration, operation, maintenance and removal of bridges, and includes the power to authorize the temporary restriction of passage through or under a bridge by use of false-work, piling, floating equipment, closure of draws, or any works or activities which temporarily reduce the navigation clearances and design flood flows, including closure of any or all spans of the bridge. Moreover, under the Ports and Waterways Safety Act of 1972 Public Law 92-340, 86 Stat. 424, the Commandant exercises broad powers in waterways to control vessel traffic in areas he determines to be especially hazardous and to establish safety zones or other measures for limited controls or conditional access and activity when necessary to prevent damage to or the destruction or loss of, any vessel, bridge, or other structure on or in the navigable waters of the United States. Accordingly, in the event that work in connection with the construction, alteration or repair of a bridge or causeway is of such a nature that for the protection of life and property navigation through or in the vicinity of the bridge or causeway must be temporarily prohibited, the Coast Guard may close that part of the affected waterway while such work is being performed. However, it is also clear that the Secretary of the Army and the Chief of Engineers have the authority, under Section 4 of the Act of August 18, 1894, as amended, (33 U.S.C. 1) to prescribe rules for the use, administration and navigation of the navigable waters of the United States. In recognition of that authority, and pursuant to Section 102(c) of the Ports and Waterways Safety Act, the Coast Guard will consult with the Corps of Engineers when any significant restriction of passage through or under a bridge is contemplated to be authorized or a waterway is to be temporarily closed.

6. Coordination and Cooperation Procedures.

A. District Commanders, Coast Guard Districts, shall send notices of applications for permits for bridge or causeway construction, modification, or removal to the Corps of Engineers Divisions and Districts in which the bridge or causeway is located.

B. District Engineers, Corps of Engineers, shall send notices of applications for permits for other structures or dredge and fill work to local Coast Guard District Commanders.

C. In cases where proposed structures or modifications or structures do not clearly fall within one of the classifications set forth in paragraph 4.A above, the application will be forwarded with recommendations of the reviewing officers through channels to the Chief of Engineers and the Commandant of the Coast Guard who shall, after mutual consultation, attempt to resolve the questions.

D. If the above procedures fail to produce agreement, the application will be forwarded to the Secretary of the Army and Secretary of Transportation for their determination.

E. The Chief of Engineers and the Commandant, Coast Guard, pledge themselves to mutual cooperation and consultation in making available timely information and data, seeking uniformity and consistency among field offices, and providing timely and adequate review of all matters arising in connection with the administration of their responsibilities governed by the Acts cited herein.

DATE: ----- 03/21/73 ------ SIGNED: C. R. BENDER /S/

DATE: 18 APRIL 1973 SIGNED: F. J. CLARKE /S/

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-99-I-1877

August 31, 1999

Mr. Jeffrey A. Lindley
Division Administrator
Federal Highway Administration
980 Ninth Street, Suite 400
Sacramento, California 95814-2724

Subject: Request for Formal Endangered Species Consultation on the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project

Dear Mr. Lindley:

The U.S. Fish and Wildlife Service (Service) has received the Federal Highway Administration's (FHWA) July 19, 1999, letter requesting initiation of formal section 7 consultation under the Endangered Species Act of 1973, as amended (Act). The consultation concerns the possible effects of the proposed San Francisco-Oakland Bay Bridge East Span Seismic Safety Project on the American peregrine falcon (*Falco peregrinus anatum*) (peregrine falcon).

The peregrine falcon was removed from the Endangered Species list, effective August 25, 1999; therefore, formal consultation is not required under the Act. The peregrine falcon will continue to be protected by the Migratory Bird Treaty Act (MBTA). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests except when specifically authorized by the Interior Department. The Service has continued its prohibition on the take of peregrine falcons for all purposes until management guidelines are developed in coordination with the States. The Office of Migratory Birds has issued a letter to all affected permit holders to alert them of this amendment to their permits. Any harassment should be avoided and minimized to the maximum extent practicable. The Service recommends that FHWA continue to work with the Service to develop measures which are consistent with the intent and spirit of MBTA and the Act.

If you have any questions about this consultation or compliance with MBTA, you may contact Cecilia Brown or Ken Sanchez at (916) 414-6625.

Sincerely,

Karen J. Miller
Chief, Endangered Species Division

cc: Mara Melandry, California Department of Transportation, Oakland, CA

OFFICE OF THE MAYOR
SAN FRANCISCO

TREASURE ISLAND PROJECT
AVENUE OF PALMS, BLDG #1
TREASURE ISLAND
SAN FRANCISCO, CA 94130
(415) 274-0660
FAX (415) 274-0299

WILLIE LEWIS BROWN, JR.

September 14, 1999

Ms. Mara Melandry
Environmental Manager, SFOBB
Caltrans
P.O. Box 23660
Oakland, CA 94623-0660

Dear Ms. Melandry:

I write in response to your letter of August 2, 1999 requesting specific information regarding Quarters 1 through 7 on Yerba Buena Island and the Naval Station Treasure Island Draft Reuse Plan.

The Navy is in the process of completing lead based paint abatement of Quarters 1-7. The Nimitz House, however, was reopened this summer for various types of special events. Quarters 2 through 7 are currently unoccupied. As you know, the City's reuse plan contemplates reuse of these historic structures, probably as a bed and breakfast complex. Market research performed in conjunction with the Authority's forthcoming economic development conveyance (EDC) application has confirmed that such hospitality type uses are among the most feasible uses on the Base, given the restriction of the Tidelands Trust and other issues affecting Treasure Island. Moreover, the Authority has received numerous unsolicited expressions of interest from developers regarding this (and other) portions of YBI.

In terms of the reuse plan, a Treasure Island Citizens Reuse Committee (CRC) was created by then Mayor Jordan in 1994 to solicit the views of the citizens of San Francisco on the planning and development of the Base. After years of planning and public input, the CRC, working in conjunction with the City's Planning Department and the Redevelopment Agency, prepared a draft reuse plan for Treasure Island. The draft reuse plan was formally endorsed by the City's Board of Supervisors and submitted to HUD and the United States Navy. One of the important functions of the draft reuse plan is that it provides the basis for the Department of the Navy's preparation of a joint EIS/EIR to satisfy State of California and Federal environmental review requirements prior to transfer and development of the Base. The EIR/EIS is currently scheduled for circulation in December. Thereafter, the City Planning Commission will hold hearings on that document.

In addition, the draft reuse plan has formed the basis of the Authority's pending Economic Development Conveyance (EDC) application with the Navy and the Authority's redevelopment plan adoption efforts. The Authority expects to submit its EDC to the Navy by December 1999. On August 19, 1999, the City's Planning Commission adopted a preliminary redevelopment plan for TI based on the Reuse Plan. The Authority expects to adopt a final redevelopment plan by August 2000.

Sincerely,

Annemarie Conroy
Executive Director

990518 - 031

THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

September 16, 1999

The Honorable Willie Lewis Brown, Jr.
Mayor of San Francisco
San Francisco, CA 94102

Dear Mayor Brown:

Thank you for your letter regarding the San Francisco-Oakland Bay Bridge project.

I am aware of the divergent opinions among federal, state, and local agencies, including the California Department of Transportation (CalTrans), the cities of San Francisco and Oakland, the United States Navy, the United States Coast Guard, and others regarding replacement of the San Francisco-Oakland Bay Bridge. Please be assured that the Federal Highway Administration (FHWA), as the lead Federal Agency, will continue to work closely with you and all parties as we move forward on this extremely complicated and important project.

I fully understand your concern that the city's modified S-1 alignment has not been adequately considered. To support your view, you cited the April 15 District Court ruling in *City of Alexandria v. Slater*, a case involving replacement of the Woodrow Wilson Memorial Bridge. While there are some similarities between the Woodrow Wilson Memorial Bridge project and the San Francisco-Oakland Bay Bridge, there are substantial and compelling differences as well.

I also appreciate your interest in the reuse of Navy property on Yerba Buena Island and any impacts the bridge replacement project may have. I am also aware of concerns with impacts to the sewer outfall belonging to the East Bay Municipal Utilities District, to operations of the Coast Guard's search and rescue operation on Yerba Buena Island, to the Navy's historic properties and its base closure plans, to the Port of Oakland's proposed expansion plan, and to the East Bay Regional Park District's park proposal. Like you, I am committed to working together to address expeditiously these and other outstanding issues so that we uphold our primary and mutual commitment to public safety.

It was out of this commitment to public safety that I asked the White House to convene a meeting on August 27 with the Navy, Coast Guard, and my senior staff, to discuss the Federal Government's responsibilities involving the San Francisco-Oakland Bay Bridge project. At that meeting, we agreed that our number one priority remains public safety and we will do nothing that detracts from that priority. We also agreed to work with the city of San Francisco, CalTrans, the city of Oakland, and federal agencies as we move forward on a number of issues involving

Yerba Buena Island, including preserving its historical properties, assessing construction impacts, and pursuing geotechnical studies. In addition, we agreed at this meeting to request that the United States Army Corps of Engineers undertake an expeditious and independent review of existing engineering analysis of the East Bay Municipal Utility District sewer outfall.

This is a complex project and we recognize our shared challenge to fully address the many issues involved. The FHWA's Division Administrator for California, Mr. Jeffrey A. Lindley, has been informed of the issues you raised. He will contact your office to set up a meeting at your convenience to discuss these concerns with him and other members of my senior staff.

I am confident that the FHWA will proceed with the San Francisco-Oakland Bay Bridge project with due diligence and care while acting with as much speed as possible for this important seismic safety project in the vital San Francisco-Oakland transportation corridor. I look forward to our continued work together as we build a truly visionary transportation system as we head into a new century and new millennium.

Please do not hesitate to call me or Michael Frazier, Acting Assistant Secretary for Governmental Affairs, at (202)366-4563 with any questions.

Sincerely,

Rodney E. Slater

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213
TEL (310) 980-4000; FAX (310) 980-4018

F/SWR4:MH

Mr. Jeffrey A. Lindley
Division Administrator
Federal Highways Administration
980 Ninth Street, suite 4000
Sacramento, California 95814

Dear Mr. Lindley:

Thank you for you letter of July 15, 1999 requesting initiation of consultation for the effects of the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project on living marine resources and habitats managed and protected by the National Marine Fisheries Service. These responsibilities are mandated by the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA).

This consultation pertains to impacts to out-migrating juvenile salmon (Sacramento River winter-run chinook salmon- endangered; Central Valley ESU spring-run chinook salmon - threatened; Central California Coast ESU steelhead - threatened; and Central Valley ESU steelhead - threatened. It also addresses impacts to the "essential fish habitat" (EFH) of fish species managed in the Pacific Groundfish Fishery Management Plan (FMP) and the Coastal Pelagics FMP. These impacts are associated with dredging, the installation of steel piles for the bridge columns that would be used for Alternative N-6, the preferred project alternative, and the dismantling of the existing east span bridge.

The maximum estimated dredging volume is 585,000 cubic yards that will excavated by mechanical dredge. If contaminated sediments are encountered, an "environmental " bucket will be used to minimize the resuspension of these sediments. Pile driving activities will occur outside of the peak juvenile outmigration period of January 1 through May 31. Should construction extend past this construction window, noise insulation devices will be installed to reduce sound pressure and impulse levels. It is our understanding that once the existing superstructure is removed, the bridge foundation will be removed and the existing piles will be cut off below the mudline. Dismantling activities include concrete splitting or cutting methods and do not include the use of explosives.

Based upon review of the biological assessment and the June 21, 1999 memorandum to M. Melandry on mitigation actions, and the "Dredged Material Management Plan, (June 1999), NMFS concurs that the project is not likely to adversely affect endangered or threatened anadromous fish species. This concludes section 7 consultation under ESA for this project. However, if new information indicates that listed species may be adversely affected by the proposed project, the project description changes including both the installation of the new bridge or the removal of the existing bridge, or if a new species is listed, further consultation may be necessary.

Regarding EFH for Federally managed fish species, NMFS believes that the project could have an adverse habitat impact unless the following EFH Conservation Recommendations are considered. NMFS recommends that all dredged material be disposed at approved upland sites such as the Hamilton site or the ocean disposal site and that no materials be disposed at the Alcatraz site. In addition, based upon your recommended mitigation measures in the EFH Assessment, NMFS strongly urges that any long-term impacts to eelgrass beds and intertidal mudflats be adequately compensated to insure no-net-loss of these important habitats. This concludes EFH consultation under the Magnuson-Stevens Act for this project. However, if there are substantial revisions to the project description, new consultation is required.

Please be advised that regulations (50 CFR Sections 600.920) to implement the EFH provisions of the MSFCMA require your office to provide a written response to this letter within 30 days of its receipt and at least 10 days prior to final approval of the action regarding our EFH recommendations. A preliminary response is acceptable if final action cannot be completed within 30 days. Your final response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH Conservation Recommendations, you must provide an explanation of the reasons for not implementing them.

If you have questions concerning this consultation, please contact Mr. Mark Helvey at (707) 575-6078.

Sincerely,

for

Rodney R. McInnis
Acting Regional Administrator

cc:

CDFG - Menlo park
USFWS - Sacramento

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
510) 286-4444
TDD (510) 286-4454

October 14, 1999

Ms. Helaine Kaplan-Prentice
Landmarks Preservation Advisory Board
250 Frank H. Ogawa Plaza, Suite 2114
Oakland, California 94612

see distribution list

Dear Ms. Kaplan-Prentice:

As you know, Caltrans and the Federal Highway Administration (FHWA) are planning a seismic safety project for the East Bay spans of the San Francisco–Oakland Bay Bridge. Project alternatives include retrofit of the existing structure or replacement of the East Bay spans with a new structure on one of three possible alignments. As part of their compliance with Section 106 of the National Historic Preservation Act, Caltrans and FHWA have solicited input from local governments, historic preservation organizations, and the public on possible measures to mitigate adverse effects on historic properties that may result from this project. Measures to mitigate project effects on historic properties will be stipulated in a Memorandum of Agreement (MOA) among FHWA, U.S. Navy, U.S. Coast Guard, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation, with the concurrence of Caltrans.

The enclosed document, "Consideration of Proposed Mitigation Measures" summarizes the mitigation measures that have been proposed by all interested parties and explains the reasons why some of these measures were not included in the MOA. It also includes copies of the relevant correspondence, summaries of the meetings that were held to discuss the Section 106 compliance process and mitigation measures, and the MOA. The process has resulted in a number of good ideas being proposed for mitigation, and we thank you for your participation.

Also enclosed for your information is a copy of the Addendum Finding of Adverse Effect report, which supplements the original Finding of Effect reports prepared in 1998. This addendum report provides additional information on the project alternatives and their relationship to historic properties, addresses potential effects of the undertaking that have been identified since completion of the original FOE report, describes the efforts to identify and evaluate potential underwater archaeological resources, and includes exhibits which show the most recent design refinements.

If you have any questions, please contact Jared Goldfine at (510) 286-6203.

Sincerely,

HARRY Y. YAHATA
District Director

By

ROBERT GROSS
District Office Chief
Office of Environmental Planning, South

encl.

Distribution list for "Consideration of Proposed Mitigation Measures"

Caltrans transmittal:

Bahlman, David	Foundation for San Francisco's Architectural Heritage
Chapell, Jim	San Francisco Planning & Urban Research Association
Conroy, Annemarie	Mayor's Treasure Island Project Office
Crowe, Michael	National Park Service, Western Regional Office
Damkroger, Courtney	National Trust for Historic Preservation
Douthat, Carolyn	California Preservation Foundation
Kaplan-Prentice, Helaine	Oakland Landmarks Preservation Advisory Board
Kelly, Tim	San Francisco Landmarks Preservation Advisory Board
Koch, Kimball	National Park Service, Western Regional Office
Lythcott, George	President, Oakland Landmarks Board
Marvin, Betty	Oakland Cultural Heritage Survey
Mikesell, Steve	JRP Historical Consulting Services
Nichol, Kate	Port of Oakland
Powell, Jane	Oakland Heritage Alliance
Tannenwald, Diane	Oakland Department of Public Works

FHWA transmittal:

Advisory Council on Historic Preservation
State Office of Historic Preservation
US Coast Guard
US Navy

M. Melandry

of California

Business, Transportation and Housing Agency

morandum

To: Kirk Walker,
State Lands Commission

Date: October 18, 1999 CHIEF\
File: Pile Installation Demonstration Project, EA 012081

From: DEPARTMENT OF TRANSPORTATION
TOLL BRIDGE PROGRAM

Subject: Maritime Archaeology, for Pile Installation Demonstration Project

We enclose for your information and files the phase 1 archaeological survey report for maritime archaeology for the pile installation demonstration project, which is being carried out in advance of construction of the east span seismic safety project on the San Francisco-Oakland bay bridge.

A portion of the remains of the Key System ferry terminal and pier is within area of potential effect for the demonstration project; these remains were found to have lost integrity and as such are not considered eligible for the National Register of Historic Places. The report has been transmitted to the Sate Office of Historic Preservation for its concurrence regarding this conclusion.

Please note that a more comprehensive report will be prepared on the results of the maritime survey of the APE for the east span seismic safety project, which includes three replacement alternatives and a retrofit existing bridge alternative. This survey included 922 acres. We will provide you with a copy of that report when it is completed.

If you have any questions, please contact Janet Pape, archaeology manager for the toll bridge program, at 510-285-5615.

Mara Melandry

Mara Melandry
Environmental Manager
San Francisco Oakland Bay Bridge

c: Janet Pape (Toll Bridge Program), Steve Hulsebus/Pochana Chongchaikit (D-4 Toll Bridge Program), Margaret Buss (HQ Environmental. Division), Cindy Adams (HQ Environmental Division)

MKM/PIDP to SLC

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

October 20, 1999

IN REPLY REFER TO

HA-CA
File #: 04-SF-80-12.2/14.3KP;
04-Ala-80-0.0/2.1KP
Document #:24669
FHWA 980717A

CERTIFIED RECEIPT RETURNED: Z 211 283 507

Mr. Daniel Abeyta
Acting State Historic Preservation Officer
Office of State Historic Preservation
P.O. Box 942896
Sacramento, CA 94296-0001

Dear Mr. Abeyta:

SUBJECT: SFOBB ADDENDUM FINDING OF ADVERSE EFFECT/PROPOSED MOA

Enclosed for your review is a copy of the "Addendum Finding of Adverse Effect" (Addendum) for the Bay Bridge East Span Seismic Safety project and proposed Memorandum of Agreement (MOA). The Addendum includes additional information on the project alternatives and their relationship to historic properties. The Addendum supplements the original two-volume Finding of Adverse Effect report which was submitted to your office in 1998. Enclosed is a second copy of the original Finding to facilitate your review.

Specifically, the Addendum addresses in more detail the following issues:

- Visual intrusion of the new bridge alternatives on Quarters 1 of the Officers' Quarters Historic District, and proposed measures to minimize this visual intrusion through replanting with mature trees.

- The effect of the replacement bridge alternatives on the Key Pier Substation in Oakland is acknowledged to be adverse.

- Results of efforts to identify and evaluate possible submerged archaeological resources in San Francisco Bay.

The Section 106 documents for this project were prepared prior to the June 17, 1999, effective date of the revised Section 106 regulations issued on May 18, 1999. Consultation with your office, MaryAnn Naber of the Advisory Council on Historic Preservation (ACHP), and interested parties to seek ways in which to avoid or reduce effects had occurred prior to the issuance of the new regulations. Nonetheless, in accordance with advice from MaryAnn Naber, the regulatory citations in the enclosed proposed MOA refer to the applicable parts of the newly adopted Section 106 regulations.
The Section 106 process has been conducted in the spirit of the new regulations as evidenced by the extensive coordination and consultation effort that included local governments and historic preservation organizations and which is documented in both the Addendum and the enclosed copy of the report entitled "Consideration of Proposed Mitigation Measures." Many of the proposed mitigation measures were either included as proposed or included in a modified form in the enclosed proposed MOA. The MOA is alternative-neutral and identifies the stipulations that would be implemented for each alternative.

By separate letter, we are transmitting the proposed MOA for concurrent review to the other signatory agencies. We request that you review the proposed MOA and submit any comments to this office within 30 days of receiving this letter. If we do not receive comments within 30 days from any of the signatory agencies, we will submit the proposed MOA for signature. If we receive comments, we will consider revisions in consultation with the commenting agency and your office and the ACHP prior to submitting the MOA for signature.

If you have any questions, please contact Joan Bollman at 916-498-5028 or Bill Wong at 916-498-5042.

Sincerely,

/s/ Robert F. Tally Jr.

For
Jeffrey A. Lindley
Division Administrator

Enclosures:
Addendum Finding of Adverse Effect
Proposed MOA
"Consideration of Proposed Mitigation Measures"

cc:
Dennis Mulligan, Caltrans District 4
Mara Melandry, Caltrans District 4
Jared Goldfine, Caltrans District 4
Andy Hope Caltrans District 4
Margaret Buss, Caltrans HQ Environmental
Cindy Adams, Caltrans HQ Environmental

cc: (E-mail)
Dan Harris, WRC-WE
Sara Purcell, WRC-WE
Jeffrey Lindley, HDA-CA
Robert Tally, HA-CA
Bill Wong, HA-CA
Joan Bollman, HA-CA

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

October 20, 1999

IN REPLY REFER TO

HA-CA
File #:04-SF-80-12.2/14.3KP;
04-Ala-80-0.0/2.1KP
Document #:P24699

CERTIFIED RECEIPT RETURNED: Z 211 283 508

Mr. Don Klima, Director
Advisory Council on Historic Preservation
Old Post Office Building
1100 Pennsylvania Ave., NW, Suite 809
Washington, D.C. 20004

Dear Mr. Klima:

SUBJECT: SFOBB ADDENDUM FINDING OF ADVERSE EFFECT/PROPOSED MOA

Enclosed for your review is a copy of the "Addendum Finding of Adverse Effect" (Addendum) for the Bay Bridge East Span Seismic Safety project and proposed Memorandum of Agreement (MOA). The Addendum includes additional information on the project alternatives and their relationship to historic properties. The Addendum supplements the original two-volume Finding of Adverse Effect (Finding) report of 1998. A copy of the original Finding was provided to MaryAnn Naber of your staff by Caltrans during her site visit in February 1999. Enclosed is a second copy of the original Finding to facilitate your review.

Specifically, the Addendum addresses in more detail the following issues:

- Visual intrusion of the new bridge alternatives on Quarters 1 of the Officers' Quarters Historic District, and proposed measures to minimize this visual intrusion through replanting with mature trees.

- The effect of the replacement bridge alternatives on the Key Pier Substation in Oakland is acknowledged to be adverse.

- Results of efforts to identify and evaluate possible submerged archaeological resources in San Francisco Bay.

The Section 106 documents for this project were prepared prior to the June 17, 1999, effective date of the revised Section 106 regulations issued on May 18, 1999. Consultation with your office, the California SHPO and interested parties to seek ways in which to avoid or reduce effects had occurred prior to the issuance of the new regulations. Nonetheless, in accordance with advice from MaryAnn Naber, the regulatory citations in the enclosed proposed MOA refer to the applicable parts of the newly adopted Section 106 regulations.

The Section 106 process has been conducted in the spirit of the new regulations as evidenced by the extensive coordination and consultation effort that included local governments and historic preservation organizations and which is documented in both the Addendum and the enclosed copy of the report entitled "Consideration of Proposed Mitigation Measures." Many of the proposed mitigation measures were either included as proposed or included in a modified form in the enclosed proposed MOA. The MOA is alternative-neutral and identifies the stipulations that would be implemented for each alternative.

By separate letter, we are transmitting the proposed MOA for concurrent review to the other signatory agencies. We request that you review the proposed MOA and submit any comments to this office within 30 days of receiving this letter. If we do not receive comments within 30 days from any of the signatory agencies, we will submit the proposed MOA for signature. If we receive comments, we will consider revisions in consultation with the commenting agency and your office and the California SHPO prior to submitting the MOA for signature.

If you have any questions, please contact Joan Bollman at 916-498-5028 or Bill Wong at 916-498-5042.

Sincerely,

/s/ Robert F. Tally Jr.

For
Jeffrey A. Lindley
Division Administrator

Enclosures:
Addendum Finding of Adverse Effect
Proposed MOA
"Consideration of Proposed Mitigation Measures"
two-volume Finding of Adverse Effect (September 1998)

cc:
Dennis Mulligan, Caltrans District 4
Mara Melandry, Caltrans District 4
Jared Goldfine, Caltrans District 4
Andy Hope Caltrans District 4
Margaret Buss, Caltrans HQ Environmental
Cindy Adams, Caltrans HQ Environmental

cc: (E-mail)
Dan Harris, WRC-WE
Sara Purcell, WRC -WE
Jeffrey Lindley, HA-CA
Robert Tally, HA-CA
Bill Wong, HA-CA
Joan Bollman, HA-CA

forn

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

October 20, 1999

IN REPLY REFER TO

HA-CA
File #:04-SF-80-12.2/14.3KP;
04-Ala-80-0.0/2.1KP
Document #:P 24702

CERTIFIED RECEIPT RETURNED: Z 211 283 509

Mr. Wayne R. Till, Chief, Bridge Section
Eleventh Coast Guard District
Building 50-6
Coast Guard Island
Alameda, CA 94501-5100

Dear Mr. Till:

SUBJECT: SFOBB ADDENDUM FINDING OF ADVERSE EFFECT/PROPOSED MOA

Enclosed for your review is a copy of the "Addendum Finding of Adverse Effect" (Addendum) for the Bay Bridge East Span Seismic Safety project and proposed Memorandum of Agreement (MOA). The Addendum includes additional information on the project alternatives and their relationship to historic properties. The Addendum supplements the original two-volume Finding of Adverse Effect (Finding) report of 1998. A copy of the original Finding was provided to you earlier by Caltrans. Enclosed is a second copy of the original Finding to facilitate your review.

Specifically, the Addendum addresses in more detail the following issues:

- Visual intrusion of the new bridge alternatives on Quarters 1 of the Officers' Quarters Historic District, and proposed measures to minimize this visual intrusion through replanting with mature trees.

- The effect of the replacement bridge alternatives on the Key Pier Substation in Oakland is acknowledged to be adverse.

- Results of efforts to identify and evaluate possible submerged archaeological resources in San Francisco Bay.

The Section 106 documents for this project were prepared prior to the June 17, 1999, effective date of the revised Section 106 regulations issued on May 18, 1999. Consultation with your office, the California SHPO, MaryAnn Naber of the Advisory Council on Historic Preservation (ACHP), and interested parties to seek ways in which to avoid or reduce effects had occurred prior to the issuance of the new regulations. Nonetheless, in accordance with advice from MaryAnn Naber, the regulatory citations in the enclosed proposed MOA refer to the applicable parts of the newly adopted Section 106 regulations.

The Section 106 process has been conducted in the spirit of the new regulations as evidenced by the extensive coordination and consultation effort that included local governments and historic preservation organizations and which is documented in both the Addendum and the enclosed copy of the report entitled "Consideration of Proposed Mitigation Measures." Many of the proposed mitigation measures were either included as proposed or included in a modified form in the enclosed proposed MOA. The MOA is alternative-neutral and identifies the stipulations that would be implemented for each alternative.

By separate letter, we are transmitting the proposed MOA for concurrent review to the other signatory agencies. We request that you review the proposed MOA and submit any comments to this office within 30 days of receiving this letter. If we do not receive comments within 30 days from any of the signatory agencies, we will submit the proposed MOA for signature. If we receive comments, we will consider revisions in consultation with the commenting agency, the California SHPO, and the ACHP prior to submitting the MOA for signature.

If you have any questions, please contact Joan Bollman at 916-498-5028 or Bill Wong at 916-498-5042.

Sincerely,

/s/ Dennis A. Scovill

For
Jeffrey A. Lindley
Division Administrator

Enclosures:
Addendum Finding of Adverse Effect
Proposed MOA
"Consideration of Proposed Mitigation Measures"
two-volume Finding of Adverse Effect (September 1998)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

October 21, 1999

IN REPLY REFER TO

HA-CA
File #:04-SF-80-12.2/14.3KP;
04-Ala-80-0.0/2.1KP
Document #: P24701

CERTIFIED RECEIPT RETURNED: Z 211 283 510

Commander Scott Smith
Engineering Field Activity West
Naval Facilities Engineering Command
U.S. Department of the Navy
900 Commodore Drive
San Bruno, California 94066-5006

Dear Commander Smith:

SUBJECT: SFOBB ADDENDUM FINDING OF ADVERSE EFFECT/PROPOSED MOA

Enclosed for your review is a copy of the "Addendum Finding of Adverse Effect" (Addendum) for the Bay Bridge East Span Seismic Safety project and proposed Memorandum of Agreement (MOA). The Addendum includes additional information on the project alternatives and their relationship to historic properties. The Addendum supplements the original two-volume Finding of Adverse Effect (Finding) report of 1998. A copy of the original Finding was provided to you earlier by Caltrans. Enclosed is a second copy of the original Finding to facilitate your review.

As you know, on August 27, 1999, a meeting regarding the proposed project was held at the White House. The meeting was attended by officials from FHWA, the Secretary of the Navy, Richard Danzig, and Assistant Secretary of the Navy, Bill Cassidy. At this meeting, Navy officials agreed to work with FHWA to reach an agreement on an MOA under Section 106 of the National Historic Preservation Act. The enclosed documents describe how comments from the Navy and other consulting parties on the potential effect of the proposed project alternatives and on proposed mitigation measures have been taken into account throughout the Section 106 process.

The Addendum addresses in more detail the following issues:

- Visual intrusion of the new bridge alternatives on Quarters 1 of the Officers' Quarters Historic District, and proposed measures to minimize this visual intrusion through replanting with mature trees.

- The effect of the replacement bridge alternatives on the Key Pier Substation in Oakland is acknowledged to be adverse.

- Results of efforts to identify and evaluate possible submerged archaeological resources in San Francisco Bay.

The Section 106 documents for this project were prepared prior to the June 17, 1999, effective date of the revised Section 106 regulations issued on May 18, 1999. Consultation with your office, the California SHPO, MaryAnn Naber of the Advisory Council on Historic Preservation (ACHP), and interested parties to seek ways in which to avoid or reduce effects had occurred prior to the issuance of the new regulations. Nonetheless, in accordance with advice from MaryAnn Naber, the regulatory citations in the enclosed proposed MOA refer to the applicable parts of the newly adopted Section 106 regulations.

The Section 106 process has been conducted in the spirit of the new regulations as evidenced by the extensive coordination and consultation effort that included local governments and historic preservation organizations and which is documented in both the Addendum and the enclosed copy of the report entitled "Consideration of Proposed Mitigation Measures." Many of the proposed mitigation measures were either included as proposed or included in a modified form in the enclosed proposed MOA. The MOA is alternative-neutral and identifies the stipulations that would be implemented for each alternative.

By separate letter, we are transmitting the proposed MOA for concurrent review to the other signatory agencies. We request that you review the proposed MOA and submit any comments to this office within 30 days of receiving this letter. If we do not receive comments within 30 days from any of the signatory agencies, we will submit the proposed MOA for signature. If we receive comments, we will consider revisions in consultation with the commenting agency, the California SHPO, and the ACHP prior to submitting the MOA for signature.

If you have any questions, please contact Joan Bollman at 916-498-5028 or Bill Wong at 916-498-5042.

Sincerely,

/s/ Dennis A. Scovill

For
Jeffrey A. Lindley
Division Administrator

Enclosures:
Addendum Finding of Adverse Effect
Proposed MOA
"Consideration of Proposed Mitigation Measures"
two-volume Finding of Adverse Effect (September 1998)

OCT 2 9 1999

EAST BAY
MUNICIPAL UTILITY DISTRICT

DAVID R. WILLIAMS
DIRECTOR OF WASTEWATER

October 28, 1999

Mr. Harry Y. Yahata
District Director
Department of Transportation
P O Box 23660
Oakland, CA 94623-0660

Dear Mr. Yahata:

This letter is in response to your letter of September 9, 1999, in which you requested answers to questions about access restrictions should the new Bay Bridge alignment be placed over the EBMUD outfall. As we have discussed on previous occasions, EBMUD does not prefer any alignment to another and believes that with the appropriate mitigation our operational requirements can be met.

In your letter, you specifically requested information regarding maintenance issues on the outfall. This response will discuss these maintenance issues, as well as other important issues to consider when considering the affect that the east span of the Bay Bridge will have on the existing EBMUD outfall.

Routine Monitoring

Currently EBMUD performs regular inspections on the submerged section of the outfall from the inside of the pipe. A diver enters the pipe and records the condition on videotape. The outfall is in good condition, but it is important to continue regular monitoring and to address maintenance issues should they arise. EBMUD would like to coordinate with the Department of Transportation to ensure that as part of Caltrans' work, EBMUD is reimbursed in full to perform a thorough inspection and videotaping of the outfall, establishing baseline conditions prior to any construction activity commencing.

Major repairs

In the future, it is possible that one or more sections of the outfall may be damaged and require repair or replacement. The submerged portion of the outfall is reinforced concrete pipe, unlined, 96" inside diameter and constructed in 24 foot sections with gasketed joints. The clearances required to replace entire sections are much greater than those required for monitoring or for minor repairs. Using industry standard construction methods, including barge and cranes, it is estimated that the clearance required for this work would be a minimum of 150' vertically from the top of the water above the pipe and approximately 50' horizontally on either side of the centerline of the pipe. This clearance would allow a barge to come in adjacent to or directly above the pipe, dredge cover material and base, to lift the old section away and to insert a new section. In shallow waters, a temporary trestle may be required for repairs. The clearances outlined above should also be sufficient for a trestle as well.

P.O. BOX 24055 . OAKLAND . CA 94623-1055 . (510) 287-1405

In 1952, when the outfall was constructed, a right of way of 50' on each side of the centerline (100' total) was established. This allows room for trenching and covering of the outfall pipe. It will be necessary to maintain at least this same right of way to allow for construction of any required repairs.

The bay bridge structure would have to be designed to allow the barge access to all sections of the outfall, with the above named clearances. EBMUD is open to considering alternate construction methods that may require less clearance if Caltrans can demonstrate to EBMUD's satisfaction that such method(s) can meet our operations and maintenance requirements at no added risk to our facilities. If alternate methods are considered and adopted, Caltrans would be liable for extra expenses for repair or replacement operations due to non-standard construction techniques.

When operating this type of large marine repair equipment there will also be clearances required from the new bridge piers. In order to provide more detail on the size and location of repair corridors required by EBMUD, we will need more information from Caltrans, including size, shape and spacing of bridge piers, as well as required clearances to pier fenders or the piers themselves. It will be important for Caltrans to design and locate piers in the vicinity of the outfall in anticipation of repairs to the outfall structure and the trenches.

As the design for the east span progresses, EBMUD will need to review preliminary designs with marine contractors and dredging companies to assure that the design allows enough clearance that any required repairs or improvements could be made. This work would also be done at Caltrans' cost.

Bypass sections may also be required to maintain flow during the repair of the existing line. To the extent that the bypass section would have to be built around a new bridge structure, the costs of the bypass would be increased. This cost increase would be the responsibility of Caltrans.

Construction Issues

The submerged portion of the outfall rests on a bed of gravel or crushed rock and is overlain by a blanket of rock, sand and mud. The constructed bed and blanket extend out as much as 50' from either side of the centerline of the pipe. It is possible that construction activities, even those outside the areas kept as clearances as noted above would affect the bedding or blanketing, rendering the outfall pipe less protected or supported. Prior to any construction Caltrans should prepare detailed construction plans to assess potential damage to the structure itself or to the bedding and protective layers. Plans to mitigate any damage due to construction activities should be developed. The study and approaches to mitigation shall be submitted to and accepted by EBMUD prior to any work taking place.

EBMUD is also concerned about the affects on the outfall of vibration of the bay bottom during construction of the new bridge span. Prior to construction, geotechnical studies showing the predicted vibration and its affect on the outfall structure (including adjacent soils, bed and blanket) shall be submitted to EBMUD for review and acceptance. Caltrans must accept responsibility of any damage to the outfall structure caused by any construction activities, including liability for fines by regulatory agencies and public acceptance of responsibility for the cause of violation and any associated environmental damage. Monitoring of the pipe and the underlayment /overlayment must be performed before construction begins and throughout construction to assure a safe, undamaged outfall.

Tidal damage due to Bay Bridge

The proximity of the bridge structure itself to the outfall may cause tidal action to scour the underlying sand or rock blanket layer. This would cause damage to the outfall and must be avoided. Caltrans should study any potential damage during the design effort and design in protective systems that will mitigate any damage caused by tidal action after construction.

Protection during seismic event.

It will also be necessary to assure that the bridge structure does not impact the outfall in the case of a seismic event. Caltrans should determine prior to construction how much deflection and movement the bridge is expected to have during a major seismic event. The bridge should be designed so that the bridge structure does not affect the outfall during a seismic event.

The above represents some of our preliminary concerns with maintaining full operations and maintenance processes at the outfall in relation to construction of the east span of the Bay Bridge. Further concerns may arise as the design progresses, and EBMUD would like the opportunity to continue to review the design features as they are developed.

If you have any questions regarding this issue, please contact me at 510-287-1846.

Sincerely,

BENNETT K. HORENSTEIN
Senior Civil Engineer

BKH:SDW:mer

W:\planning\Agency Contact\Caltrans bridge-outfall.doc

DIANNE FEINSTEIN
CALIFORNIA

COMMITTEE ON APPROPRIATIONS
COMMITTEE ON THE JUDICIARY
COMMITTEE ON RULES AND ADMINISTRATION

United States Senate

WASHINGTON, DC 20510-0504

November 8, 1999

The Honorable Gray Davis
Governor
State of California
State Capitol First Floor
Sacramento, California 95814

Dear Governor Davis,

I am writing to you regarding the San Francisco-Oakland Bay Bridge seismic safety replacement and retrofit project and the larger issue of regional congestion. Numerous citizens have contacted my office with concerns over the increasing level of traffic gridlock in the Bay Area and the length of time it has taken Caltrans to proceed with critical bridge retrofit projects.

This past summer I met with Mayors Willie Brown and Jerry Brown to discuss concerns regarding the Bay Bridge retrofit project. Thereafter, my staff held a series of meetings with representatives of the cities of San Francisco and Oakland, the Metropolitan Transit Commission (MTC), Caltrans and interested individuals to gather information and explore alternatives. This letter is a result of those meetings.

As a lifelong resident and former Mayor of San Francisco, I am concerned, as I know you are, about the safety of the 280,000 people who travel across the Bay Bridge each day. This was heightened by the recent release by the U.S. Geological Survey of figures showing a 70 percent probability that one or more damaging earthquakes of magnitude 6.7 or larger will strike the Bay Area within the next 30 years. The seismic safety of the Bay Bridge must be the utmost priority, and it must be accomplished quickly. We cannot afford to wait.

I am pleased the Navy has granted Caltrans permission to proceed with geological testing on Yerba Buena Island so that design work on the new eastern span will move forward. I understand that a replacement of the eastern span was chosen after it was determined that a replacement could provide a "lifeline" safety standard that retrofit of the existing span could not meet. I trust the seismic superiority and compelling lifeline safety benefits of the proposed design have been clearly demonstrated to local elected officials and constituents.

The Caltrans Seismic Safety Board has determined that a complete retrofit of the eastern span would require replacement of 75 to 90 percent of all bridge components and cause potential traffic delays over a period of four to five years. I understand the resulting safety improvements would protect life, but could not guarantee the eastern span would remain usable after a major quake. However, I have also been told that the interim retrofit will only eliminate the most glaring vulnerabilities and protect the public only during a smaller magnitude earthquake.

In addition, the growing traffic congestion in the Bay Area has become a concern of the residents, business leaders and elected officials. The MTC has predicted a 30 to 40 percent increase of Bay Bridge traffic -- and a regional traffic gridlock increase by 250 percent -- by 2020. Both the Silicon Valley Manufacturing Group and the Bay Area Economic Forum have recently released studies citing growing traffic congestion as one of the primary threats to the Bay Area's economic viability for the 21st Century. The Bay Area Council estimates that approximately 100,000 hours are lost to congestion in the nine-county Bay Area per day and the annual cost of this congestion in terms of loss productivity and wasted resources is more than $300 million.

These issues have led me to the following conclusions, which I would like to share with you:

- An interim retrofit, accelerated to the greatest extent, is vital to protect traveler safety until the replacement of the eastern span is completed. With at least five years remaining until a replacement bridge can be opened to the public, the interim retrofit becomes a necessity. Based on what I have learned, should there be a major earthquake on either the Hayward and San Andreas Faults, the safety of the travelers on the Bay Bridge is at great risk .

- The load designs of any replacement structure for the eastern span of the Bay Bridge, as well as the retrofit plans for the western span, should be re-examined by Cal Trans in order to ensure the designs accommodate future Bay Area rail transit. It has been reported that the east span replacement currently under design will not be able to accommodate a rail transit system without eliminating vehicle lanes. I also understand the west span can accommodate the additional weight of rail and existing traffic lanes when structural additions are made.

- A regional traffic and transportation study for the Bay Area with respect to alternative Bay crossings and other options to increase the capacity and mobility for transbay travel between San Francisco, the East Bay and the Peninsula must be undertaken promptly. I commend the MTC for work on the Regional Transportation Plan as a tool for determining the priority of upcoming projects. However, I understand the last study of alternative Bay crossings was completed in 1991. A review and update of the 1991 study would be beneficial to ensure both the state and federal governments have the best transit and traffic information available to determine spending priorities.

I look forward to working with you to ensure the transportation network for the Bay Area, and the State of California, will meet the growing needs of the population. I appreciate your time and attention to these matters and look forward to hearing from you soon.

With warmest personal regards.

Sincerely yours,

30111

ATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, Governor

FICE OF HISTORIC PRESERVATION
ARTMENT OF PARKS AND RECREATION
)X 942896
MENTO, CA 94296-0001
553-5624 Fax (916) 653-9824
ihpo@ohp.parks.ca.gov

November 19, 1999

Reply To: FHWA980717A

Jeffrey A. Lindley
Division Administrator
California Division
Federal Highway Administration
980 Ninth Street, Suite 400
Sacramento CA 95814-2724

Re: 04-SF-80-12.2/14.3KP' 04-Ala-80-0.0/21.KP, SFOBB Addendum Finding of Adverse Effect/Proposed MOA

Dear Mr. Lindley:

This letter will serve to acknowledge receipt of the documents cited above, and of your request for our response to this submittal.

The conclusions of the Addendum Finding of Adverse Effect for the undertaking are summarized in Section VII., page 11. I concur with the current determination – and affirm the earlier determination – that all of the build alternatives would adversely affect historic properties.

The MOA you have provided is still under review. FHWA will receive an additional SHPO response to that document when our review is concluded. I agree with the decision by FHWA to include in the proposed MOA, citations that reflect the new 36 CFR Part 800 regulations, adopted effective June 17, 1999.

If you have any questions, please contact Hans Kreutzberg, Chief of Project Review.

Sincerely,

Daniel Abeyta, Acting
State Historic Preservation Officer

TE OF CALIFORNIA – THE RESOURCES AGENCY P31096 GRAY DAVIS, Governor
FICE OF HISTORIC PRESERVATION
PARTMENT OF PARKS AND RECREATION
BOX 942896
RAMENTO, CA 94296-0001
53-6624 Fax: (916) 653-9824
@ohp.parks.ca.gov

February 3, 2000

Reply To: FHWA 980717A

Mr. David A. Nicol
Acting Administrator, California Division
Federal Highway Administration
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

Dear Mr. Nicol:

Re: Memorandum of Agreement for San Francisco-Oakland Bay Bridge East Bay Span Seismic Safety Project

I have completed my review of the draft Section 106 Memorandum of Agreement (MOA) prepared by FHWA for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. I have the following comments on this document:

1. I recommend that FHWA consider consolidating provisions that pertain to amendment, non-compliance and termination of the MOA. I have attached examples of such consolidated provisions for your consideration.

2. I recommend that the stipulation pertaining to disputes be revised in accordance with the attached examples. In my opinion, these examples are more consistent with the current Part 800 regulation and offer the signatories greater flexibility in concluding the dispute resolution process.

3. I recommend that Stipulation VI., pertaining to review of implementation, be expanded to include language that addresses the duration of the agreement. I have attached examples of such language for your consideration.

4. I recommend that FHWA include in the MOA a stipulation that provides for execution of the agreement in any number of counterparts. This will expedite the process of executing the MOA.

5. I recommend that FHWA include in the MOA a stipulation providing for public objections. An example is attached for your consideration.

6. I suggest that the introduction to the Stipulations section be revised and reorganized in accordance with SHPO recommendations already shared with Caltrans.

7. I recommend that Stipulation VIII. of the MOA be deleted. A suitably worded stipulation for amendments, noncompliance and termination will be sufficient.

8. I recommend that FHWA include in the MOA a stipulation pertaining to confidentiality of archeological site records. An example is attached for your consideration.

Minor technical changes to the MOA can be addressed quickly through consultation among FHWA and Caltrans at the staff level.

Your consideration of the foregoing suggestions is appreciated. If you have any questions about these suggestions, please do not hesitate to contact me or Hans Kreutzberg of my staff at your convenience. I look forward to receiving the final MOA as soon as possible.

Sincerely,

Daniel Abeyta

Daniel Abeyta, Acting
State Historic Preservation Officer

Attachments

EXECUTION OF AGREEMENTS

This MOA may be executed in any number of counterparts, each of which shall be deemed to be an original, but all together shall constitute but one and the same MOA. FHWA will ensure that each party is provided with a copy of the fully executed MOA. This MOA will become effective on the date that FHWA received the last signature.

EXECUTION AND IMPLEMENTATION of this MOA evidences that FHWA has afforded the Council a reasonable opportunity to comment on the Undertaking and on the Undertaking's effects on historic properties, that FHWA has taken into account the effects of the Undertaking on historic properties, and that FHWA has satisfied its responsibilities under Section 106 of the National Historic Preservation Act and applicable implementing regulations.

GRAY DAVIS, Governor

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
50 VAN NESS AVENUE, SUITE 2011
SAN FRANCISCO, CALIFORNIA 94102-6080
PHONE: (415) 557-3686

February 4, 2000

DJM

Mr. Dennis Mulligan
Deputy District Director
California Department of Transportation
District 04
P. O. Box 23660
Oakland, California 94623-0660

SUBJECT: Request for Preliminary Determination of Consistency with the Coastal Zone Management Plan; San Francisco –Oakland Bay Bridge, East Span

Dear Mr. Mulligan:

This letter is in response to your request for a Consistency Determination for the San Francisco-Oakland Bay Bridge, East Span to be constructed in Alameda and San Francisco Counties.

The BCDC Management Program provides that consistency matters will be handled as much as possible like permits. Section 930 of the Federal regulations on consistency also provides for consistency determinations "for every major funding phase of the Federal assistance activity which entails the consideration of new information not previously reviewed." I, therefore, believe I can comply with your request, but only under the following conditions:

1. This request comes at the environmental document stage and, because the staff rather than the Commission normally comments on projects at this stage, I believe I can make this determination at this time. However, while my determination is based on the McAteer-Petris Act, the Bay Plan, and the Commission's Management Program, it is, like staff comments on environmental documents generally, a staff determination only. A further and final Commission decision on the project and its consistency with the BCDC Management Program will be made at the permit application stage; and

2. This Determination is based upon and goes no further than the information contained in the Environmental Impact Statement. In particular, you have indicated, and the assumptions and uncertainties in the Environmental Impact Statement confirm, that the design of the bridge and its precise location are not final. While the information in the environmental Impact Statement permits me to conclude that a bridge can probably be constructed in this area in a manner consistent with the BCDC Management Program, this determination

does not mean that the design proposed in the Environmental Impact Statement is consistent with the Program. Our comments later on in this letter elaborate further on our concerns in this regard.

Preliminary Comments on Fill for the Bridge

The proposed project would involve the placement of fill both in and over areas within the Commission's "bay" jurisdiction. The Commission's law and plan restrict fill to water-oriented uses, limit any fill placed to the minimum fill necessary, and require that the fill be designed to minimize impacts to existing wetland resources. The Commission's law defines bridges as a water-oriented use that can be permitted on fill. The staff believes that a bridge can be designed at this location that minimizes fill and impacts to the Bay. The staff has also reviewed proposed mitigation for the unavoidable adverse impacts and, while recognizing that much of the details of the mitigation plan need refinement, believe that a mitigation program can be designed at the proposed mitigation site that will appropriately offset the adverse impacts of fill placed for the bridge.

Preliminary Comments on Proposed Public Access

The Commission's law also requires that projects the Commission authorizes must provide the maximum feasible public access to and along the Bay consistent with the project. The Department of Transportation (CalTrans) is proposing to provide a bicycle/pedestrian path on the southern edge of the new San Francisco-Oakland Bay Bridge. Although details of the public access are still being developed and details concerning how the path will connect to existing shoreline access areas remain to be worked out, the Commission staff believes that the proposed public access would be located at the most desirable location for public access across the bridge, and that the public access across the bridge can be appropriately connected to shoreline access areas. We also believe that the rail height and design of the new bridge can be designed so that it affords views of the Bay, as required by the San Francisco Bay Plan policies on Appearance, Design, and Scenic Views.

To summarize, while these are staff comments only and a final Consistency Determination must await Commission approval of a permit for the new San Francisco-Oakland Bay Bridge East Span, the bridge design and location that CalTrans has presented to staff to date appears to be in general conformance with the Commission's law and policies. Its past performance on this project suggests that as the bridge design is refined, CalTrans is willing to work with Commission staff to assure that the design is fully consistent with the Commission's law and policies. Therefore, I believe that the project in concept, generally conforms to the Commission's amended coastal management program for San Francisco Bay.

I hope this letter clarifies our position. If you have any further questions, please contact Art Duffy of our staff at (415) 557-8766.

Sincerely,

WILL TRAVIS
Executive Director

DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-5006

IN REPLY REFER TO:

February 18, 2000

Jeffrey A. Lindley
Federal Highway Administration
Division Administrator
California Division
980 Ninth Street - Suite 400
Sacramento, CA 95814-2724

Dear Mr. Lindley:

I am writing in response to your letter of February 10, 2000, concerning the proposed Memorandum Of Agreement (MOA) for The San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. Although we had not yet forwarded our formal comments on the October 21, 1999 MOA, we have been discussing our concerns with your agency. Thus, we were surprised to learn that this MOA has been revised and signatures obtained without further consultation with the Department of the Navy and the other signatories and consulting parties.

As the Federal landowner for most of the property on Yerba Buena Island and most of the cultural resources on that island as well as Treasure Island, the Department of the Navy has statutory responsibilities under the National Historic Preservation Act of 1966, 16 U.S.C. § 470f (1994) (NHPA), which mandates that Navy must assess the effects that proposed projects would have on Navy's cultural resources on those islands. Consequently, Navy must be a party to the MOA.

Naval Station Treasure Island, which includes Yerba Buena Island, was designated for closure in the 1993 round of Defense Base Closures and Realignments and closed on September 30, 1997. The Navy property on Treasure Island and Yerba Buena Island falls within the City limits of the City of San Francisco, and the City is the Local Redevelopment Authority recognized by the Department of Defense as the entity responsible for planning the reuse and redevelopment of Naval Station Treasure Island, including the Navy property on Yerba Buena Island. The City of San Francisco plans to preserve and adaptively reuse the Navy cultural resources on Yerba Buena Island.

The Department of the Navy has consulted with the City of San Francisco, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation (ACHP) on issues arising out of the proposed Federal disposal of Naval Station Treasure Island and local reuse of Navy's cultural resources on Treasure Island and Yerba Buena Island. These consultations will likely conclude with the imposition of historic preservation land use restrictions on those parcels that contain historic and archeological properties.

Before the Department of the Navy can execute the proposed Memorandum Of Agreement, there are several issues that must be resolved and I will address each in turn.

First, based upon the information provided by the Federal Highway Administration (FHWA), the nature of FHWA's Federal undertaking remains unclear. It appears that the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project is a California State project. The Federal Highway Administration is neither providing funds nor granting approvals for this project. It is evident that the two Federal agencies that do have responsibility for granting or denying approval of actions related to the project are the Department of the Navy and the United States Coast Guard.

Consequently, we request that the Federal Highway Administration provide an explanation of the basis for its apparent belief that it is the lead agency responsible for this project. This explanation should be set forth in the MOA with stipulations that define the roles and responsibilities of each Federal agency.

Second, we understood that all Section 106 consultations that were not essentially concluded by June 17, 1999, were to be completed under the revised Section 106 regulations. The consulting parties have not concluded any agreements that would be adversely affected by the new regulations. Thus, we ask that this consultation process follow the new regulations.

While your letter states that the consultations have been conducted in the spirit of the new regulations, there are several respects in which important requirements of the new regulations have not been satisfied. For example, there is no documentation evidencing that all potential parties have been invited to participate. The proposed MOA does not state that Native Americans have been invited to participate in the process

nor does the MOA discuss the involvement of local government agencies in the process.

Third, the MOA should contain a "Whereas" clause that states that the Navy property, Naval Station Treasure Island, was closed under the authority of the Defense Base Closure and Realignment Act of 1990, 10 U.S.C. § 2687 note (1994), and that the Local Redevelopment Authority, the City of San Francisco, has proposed to preserve and adaptively reuse the historic properties on Yerba Buena Island. The MOA should also indicate that the Department of the Navy's disposal action would involve a separate Section 106 consultation process.

Fourth, the City of San Francisco should be invited to participate in the consultation process as a consulting party. In its capacity as the Department of Defense-designated Local Redevelopment Authority for Naval Station Treasure Island, the City is an important stakeholder in this process. The 1999 regulations made this clear when they stated that "[a] representative of a local government with jurisdiction over the area in which the effects of an undertaking may occur is entitled to participate as a consulting party." Navy and the City are currently exercising concurrent legislative jurisdiction over Naval Station Treasure Island property, including Yerba Buena Island.

Fifth, the Costanoan Rumsen Carmel Tribe sought to participate in the Section 106 process in response to your letter of May 7, 1999, but the Tribe has not been recognized in the proposed MOA. No information has been provided to explain why the Tribe's request was not granted or why the Tribe's comments were not sought concerning the mitigation proposed for the archeological site on Yerba Buena Island. It is apparent that the archeological site on Yerba Buena would be adversely affected by each of the four "build" alternatives as well as the temporary bridge alignments. Thus, Native American groups should be afforded the opportunity to participate in the Section 106 process. Moreover, since the archeological site is known to have contained human remains, the proposed MOA must consider issues arising under the Native American Graves and Repatriation Act. These issues are typically resolved by partnering with Native American Tribes; thus, it is important for the parties to discuss responsibilities for these issues arising out of the FHWA undertaking.

Sixth, the proposed MOA does not treat the impacts on Navy and Coast Guard property that would result from construction of

the temporary bridges necessary for each of the alternative alignments. For example, the Draft Environmental Impact Statement Statutory Exemption (EIS/SE) discloses that the temporary bridge would be built over Nimitz House (Quarters One), but does not describe the effect that this placement would have on the Nimitz property.

Seventh, it would be at least prudent, if not required, that the proposed MOA contain a description of each of the four "build" alternatives and the attendant temporary bridge alignments and an explication of the adverse effects that would result from each alternative and each temporary bridge alignment. It is clear that, in some cases, the temporary bridge would have a severe adverse impact on the Navy property. The stipulations should relate the alternative and its effects on each of the cultural resources.

Eighth, the proposed MOA contradicts the impact findings of the FHWA's Draft EIS/SE for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. The Draft EIS/SE states that each of the action alternatives would have an adverse impact on Navy's historic properties. The proposed MOA, however, states only that the project "may" affect those properties. The consulting parties and signatories must develop a consensus regarding the impacts on Navy's historic properties and on the archeological sites. The Department of the Navy also disagrees with the findings in the Draft EIS/SE and the proposed MOA that the project would not have an adverse effect on Nimitz House. The project would place Nimitz House under the span of two of the four temporary bridge options.

This consultation process must meet the Department of the Navy's obligations under Section 106 of NHPA. Thus, we request that you provide us with copies of all informational materials that FHWA generated and all correspondence between FHWA and the signatories and the public. In particular, we request materials and correspondence that were used in any outreach to interested groups, associations, and Native American Tribes. For example, there were groups from the Oakland area who expressed interest in the historic preservation issues and proposed mitigation measures to protect the historic resources on Yerba Buena Island. There is, however, no documentation that evidences any outreach that FHWA conducted in the San Francisco Bay Area.

The Department of the Navy also has responsibility under the National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321-4370b (1994) (NEPA) for the Federal action constituting the

disposal of Naval Station Treasure Island. Thus, resolution of the Section 106 issues described in this letter does not also constitute a Navy decision to proceed with any real estate action that would be necessary to permit the use of Navy property, e.g., construction easements. Navy must complete the NEPA process and issue a Record Of Decision before any such action may take place.

We look forward to meeting with all of the consulting parties to develop an MOA that addresses the substantial effects that the proposed project would cause on the historic properties. As the Federal agency that owns the cultural resources that would be affected by the proposed project, we must ensure that we have fulfilled our responsibilities under Section 106.

While we have other comments on the proposed MOA, we believe that they can be discussed at future consultation meetings. Issues affecting Naval Station Treasure Island have been transferred to our San Diego office. If you have questions, please contact Mr. Ron Plaseied, Base Closure Manager, at (619) 532-0986 or Ms. Melanie Ault, Environmental Planner, at (619) 532-0954.

Sincerely,

G. J. BUCHANAN
Captain, CEC, USN
Commanding Officer

Copy to:
Honorable Willie L. Brown, Jr. (San Francisco Mayor)
Mr. Dan Abeyta (State Historic Preservation Officer)
Mr. Lee Keatinge (Advisory Council on Historic Preservation)
Mr. Denis J. Mulligan (Department of Transportation, District 4)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

February 29, 2000

IN REPLY REFER TO

HDA-CA
File #: 04-SF-80-12.2/14.3KP;
04-Ala-80-0.0/2.1
Document #: P31435

G. J. Buchanan, Captain, CEC, USN
Commanding Officer
Department of the Navy
Engineering Field Activity, West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, CA 94068-5008

Attn: Mr. Ron Plaseied, Base Closure Manager

Dear: Captain Buchanan:

SUBJECT: SFOBB MOA - PRELIMINARY RESPONSE TO NAVY COMMENTS

We want to thank you for your quick response to our February 10, 2000, letter regarding the historic properties Memorandum of Agreement (MOA) for the proposed San Francisco Oakland Bay Bridge East Span Seismic Safety Project (SFOBB East Span Seismic Safety Project or Project). We also appreciate your agreement to meet with us on March 1, 2000, to discuss the comments in your February 18, 2000, letter and our responses to those comments. We have prepared this preliminary response letter for purposes of discussion at the March 1st meeting and will send a formal response letter following the meeting. Our objective is to have a MOA signed by the Navy by March 3, 2000, or sooner.

Let me assure you that we recognize the Navy as the owner of most of the land and most of the cultural resources on Yerba Buena Island and understand the importance of the Navy as a party to this MOA. We also understand that the Navy will have additional Section 106 responsibilities with regard to reuse by San Francisco under Defense Base Closures and Realignments (BRAC) for historic properties on Yerba Buena Island and on Treasure Island that are not affected by the SFOBB East Span Seismic Safety Project and therefore are not covered by the MOA. This MOA is to document the signatory agencies' agreement with the measures to resolve effects on all National Register eligible or listed properties affected by the SFOBB East Span Seismic

Safety Project and would be incorporated into the Project. We believe that the Navy's responsibilities with respect to authorizing the use of Navy lands for the SFOBB East Span Seismic Safety Project can be met through participation in this MOA.

We recognize that the City of San Francisco is the Local Redevelopment Authority under BRAC procedures and are aware of the City's longterm reuse plans as presented in its Draft Reuse Plan. We believe that the City's plans for adaptive reuse of cultural resources will not be impaired by the Project which will incorporate measures to resolve effects of the Project identified in the MOA. For further discussion of the Project impact on the reuse plan please refer to the booklet titled "Land Use Issues Associated with the SFOBB East Span Seismic Safety Project and the Naval Station Treasure Island Draft Reuse Plan" which was provided to Commander Scott Smith (Attention: Dennis Kelly) on January 18, 2000.

The following are the issues identified in your February 18, 2000, letter to be discussed at our March 1st meeting.

1. Nature of Federal Highway Administration's (FHWA) Undertaking/Lead Agency Status

   FHWA has National Environmental Policy Act (NEPA) responsibilities due to Interstate Defense Highway access and design exception approval authority. The State has recently requested federal funding, a potential for which had always been recognized. The Coast Guard (USCG) has NEPA responsibilities due to its bridge permit for navigational features, for its permits to Caltrans for construction easements, and for a potential land transfer to the State. Because the Project is a highway project and FHWA has expertise in this area, DOT Secretary Slater designated FHWA as the lead agency and USCG as a cooperating agency. The Navy has NEPA responsibilities due to issuance of permits to Caltrans for construction easements and for a potential land transfer to the State. The FHWA has always treated the Navy as a cooperating agency under NEPA.

   FHWA has NEPA and related Section 106 of the National Historic Preservation Act (Section 106) responsibilities encompassing the entire SFOBB East Span Seismic Safety Project. Its Section 106 responsibilities involve the historic bridge and contributing elements on both ends of the bridge east span as well as the Navy's historic buildings, district and archeological site on Yerba Buena Island. It is appropriate under the Section 106 regulations that FHWA, with its lead on the NEPA compliance for the entire SFOBB East Span Seismic Safety Project, be lead agency for the Section 106 requirements for the bridge project as well. The Coast Guard and the Navy undertakings that trigger Section 106 are the same actions that trigger NEPA responsibilities. The Navy and Coast Guard Section 106 responsibilities with regard to their undertakings for the SFOBB East Span Seismic Safety Project can be accomplished through their input and signatures on the MOA.

   The third "Whereas" clause of the MOA designates the roles of FHWA, USCG and Navy, but other wording could be added if necessary.

2. Use of Revised Section 106 Regulations

Mary Ann Naber, Advisory Council on Historic Preservation (ACHP), has advised FHWA that since the consultation process with the ACHP was initiated prior to the new regulations coming into effect, we could conclude the MOA process under the old regulations. (The MOA citations to the regulations are, however, made to the new regulations for ease of reference.) As your files will show, consultation has been extensive. During February 1999, Mary Ann Naber attended a two-day series of meetings arranged by Caltrans and FHWA with the various consulting parties and Dr. Hans Kreutzberg of the State Historic Preservation Office. Proposed mitigation measures were discussed at these meetings. These steps in consultation and others were documented in the "Addendum Finding of Adverse Effect" and in the "Consideration of Proposed Mitigation Measures" sent to the Navy on October 20, 1999, and will be summarized in the FEIS. As stated in our February 10, 2000 letter, we believe the consultations have been conducted in the spirit of the new regulations, as well in compliance with the regulations in effect when the Section 106 consultation process was initiated.

The MOA does state in the sixth "Whereas" clause that local governments and other interested parties have been consulted and comments taken into account. The purpose of the MOA is to address measures to resolve effects and additional procedural descriptions are unnecessary in the MOA.

The response numbered "5," below, addresses consultation with Native American tribes or groups.

3. Notation of BRAC/San Francisco's Reuse/Separate BRAC 106

A new "Whereas" clause concerning BRAC, the City of San Francisco's expected reuse of Navy land and the Navy's conduct of a separate 106 consultation process for the separate BRAC undertaking can be added to the MOA, if necessary.

4. City of San Francisco as a Consulting Party

The City of San Francisco was invited to participate in the consultation process and did participate by attending meetings, writing letters, and commenting on those portions of the DEIS that deal with historic properties. Opportunities to comment on Section 106 technical reports have been provided throughout the Section 106 and NEPA processes. The City's comments have been taken into account.

As the Navy made clear in its comments on the DEIS and more recently at meetings, the Navy currently owns the land and the City of San Francisco will not be the land owner until the BRAC process is completed. We feel that until the City of San Francisco obtains the land under BRAC, the Navy should act on its behalf since the City of San Francisco is the designated Local Redevelopment Authority under BRAC. This position is supported by the fact that the City's reuse plan must first be approved by the Navy and,

therefore, the Navy is the agency with jurisdiction. Nonetheless, the City of San Francisco's views
have been and will continue to be sought and its comments taken into account.

The MOA can be amended in the future when and if the transfer of property from the Navy to the City of San Francisco takes place, and if the City will be taking on any responsibilities under the MOA. Further, until the environmental process for the BRAC action is completed and a record of decision is filed, the ultimate disposition of the property is not confirmed. Accordingly, it is not appropriate for the City to sign the MOA at this time.

5. Participation of the Costanoan Rumsen Carmel Tribe

We wish to clarify the roles of the Native American tribes under Section 106 and under American Graves Protection and Repatriation Act (NAGPRA). The regulations implementing Section 106, define "Indian tribes" for the purposes of identifying Native American tribes that shall be consulting parties as those that have Federal recognition. NAGPRA, on the other hand, requires Federal land managing agencies consult with federally recognized Indian tribes on the repatriation of human remains or cultural objects recovered during intentional excavations or inadvertent discoveries on federal or tribal land. The archeological site CA-SFr-04/H lies within an area considered to be within Ohlone territory; however, there are no federally recognized Ohlone tribes. The Costanoan Rumsen Carmel Tribe, an Ohlone tribe, is not a federally recognized tribe.

Ohlone tribes, including the Costanoan Rumsen Carmel Tribe, have been consulted as documented in the "Addendum Finding of Adverse Effect." Caltrans sent letters dated May 7, 1999, to interested Native Americans identified by the Native American Heritage Commission. These letters solicited information both for Section 106 purposes and for NAGPRA purposes. They solicited information and concerns about archeological site CA-SFr-04/H and any issues Native Americans would like to see addressed in the treatment plan for the site. NAGPRA information that was solicited included the identification, evaluation and treatment of human remains, associated grave goods and items of cultural patrimony which might be uncovered at CA-SFr-04/H. A copy of the letter was sent to U.S. Navy personnel.

Furthermore, Ohlone will be invited to monitor archaeological excavations and to comment on the treatment plan. Stipulation IV in the MOA describes Native American participation in the archeological excavations and the treatment plan.

The Navy and the Coast Guard's NAGPRA responsibilities are addressed in Stipulation IV.G. "Treatment of human remains."

In order to be sure that we have conducted Native American coordination that meets the Navy's requirements, we would like a copy of the Navy's requirements.

6. Impacts of the Temporary Bridges (Detours)

The effects of all aspects of the Project, including those of the temporary detour structures during construction, are addressed in the "Finding of Effects" and the "Addendum Finding of Adverse Effect." The MOA doesn't ordinarily include a description of the effects, it identifies the agreed upon measures to resolve effects.

The "Addendum Finding of Adverse Effect" documents that detour options that would have spanned the Nimitz House were withdrawn from further consideration prior to completion of the "Addendum Finding of Adverse Effect." As described in that report, only one detour option is currently being considered and this option would not span the Nimitz House. Please refer to page 5 and to Exhibits 2 through 7 of the "Addendum Finding of Adverse Effect."

Mitigation measures to resolve the effects of the temporary detours are included in the MOA.

7. Description of Alternatives (incl. Temporary Structures) and Adverse Effects

The description of alternatives and adverse effects is in the Finding of Adverse Effect documents and in the EIS. The purpose of the MOA is to document agreement on mitigation measures to resolve those effects.

8. MOA Contradiction of DEIS/Change From "Would Have" to "May"

Since the MOA is alternative neutral and addresses all alternatives under consideration, "may also have effects on various Navy buildings on Yerba Buena Island" was used to acknowledge that different Navy buildings are affected by the different alternatives. For properties that were affected under all alternatives, "will" was used.

As noted above, the Nimitz House would not be spanned by any temporary structure still under consideration.

We have summarized mitigation input from consulting parties in the document "Consideration of Proposed Mitigation Measures" and in the "Addendum Finding of Adverse Effects." Included were a number of groups from Oakland. In your letter you stated that there were groups from the Oakland area who expressed interest in the historic preservation issues and proposed mitigation measures on Yerba Buena Island. We are not aware of any comments that are not addressed in the documents above. If you have additional information, please share it with us.

FHWA and Caltrans would be happy to provide the Navy with additional documentation of the 106 consultation. We look forward to identifying the documentation you need at the March 1st meeting. Discussion of 106 consultation will be included in the FEIS. We will work with the

Navy so that its obligation under 106 will be met to protect the historic resources on Yerba Buena Island.

We are aware that the Navy has further BRAC requirements with regard to the disposal of land on Naval Station Treasure Island. We will meet with the Navy separately to address Project needs with regard to rights-of-way, but encourage the Navy to use this MOA and the SFOBB East Span Seismic Safety Project NEPA document for use in the land transfer for this project.

We look forward to our meeting March 1, 2000.

Sincerely,

/s/ David A. Nicol

David A. Nicol
Acting Division Administrator

cc:
Commander Scott Smith, Navy
Hans Kreutzberg, SHPO
Mary Ann Naber, ACHP
Denis Mulligan, Caltrans Dist. 4

GRAY DAVIS
GOVERNOR

CALIFORNIA TRANSPORTATION COMMISSION
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P.O. BOX 942873
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FAX (916) 654-4364
(916) 654-4245

February 29, 2000

Mr. Ron Plaseied
Base Closure Manager
Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, CA 92132-5190

Dear Mr. Plaseied:

As you know, Caltrans provided the California Transportation Commission with a status report on the San Francisco-Oakland Bay Bridge replacement at the Commission's February 23, 2000 meeting. The Commission was extremely disappointed that the Navy did not attend for the second time. We hope you will be able to attend the Commission's March 29-30, 2000 meeting to explain what is needed to obtain the Navy's cooperation to complete this critical public safety project. Each day of delay in the project puts millions of Californians at risk.

The meeting will be held in Sacramento, in Room 4202 of the State Capitol. This item is again expected to come up on the agenda about the middle of the morning on March 30, but can be adjusted to meet your schedule.

The lack of a solution to the bridge replacement problem puts the public in serious jeopardy, and as such, your attendance at our March meeting is crucial. If you have any questions, please contact the Commission's Executive Director, Robert Remen at (916) 654-4245.

Sincerely,

DANA W. REED
Chairman

cc: Vice President Al Gore, The White House, Washington, D.C. 20501
Honorable William S. Cohen, Secretary of Defense, 1000 Defense Pentagon,
Honorable Richard Danzig, Secretary of the Navy, 1000 Navy Pentagon, Wa
Denis Mulligan, District 4, Caltrans

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DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-5006

IN REPLY REFER TO:

21 MAR 00

Mr. Dana W. Reed
Chairman
California Transportation Commission
1120 N Street, MS-52
Sacramento, CA 95814

Dear Mr. Reed:

I am writing in response to your letter of February 29, 2000, inviting the Department of the Navy to attend the California Transportation Commission's meeting on March 30, 2000, concerning the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project (SFOBB Safety Project).

For more than two years, Navy has taken the consistent position that the impacts of the SFOBB Safety Project need to be addressed by all affected parties, including the City and County of San Francisco. When that inclusiveness occurs, we are confident that the requirements of Federal laws relevant to this matter (e.g., the Defense Base Closure and Realignment Act of 1990 (10 U.S.C. 2687 note (DBCRA)); the National Environmental Policy Act of 1969 (42 U.S.C. §§ 4321-4370h (NEPA)); and the National Historic Preservation Act of 1966 (16 U.S.C. §§ 470-470w-6 (NHPA)) can be fully met. At the same time, when all affected parties are substantively involved, all critical imperatives can be addressed and an integrated response to those imperatives can be developed. We remain puzzled at the inexplicable exclusion of San Francisco from matters in which it has obvious and substantial interests, particularly in the face of Navy's repeated efforts to gain the City's inclusion.

Navy has been working with the Department of Transportation's Federal Highway Administration (FHWA) and the California Department of Transportation (CALTRANS) over a long period of time concerning the SFOBB Safety Project. For instance, on a number of occasions Navy has met with representatives of the FHWA and CALTRANS and Navy submitted extensive substantive comments on the Draft Environmental Impact Statement being prepared for this project pursuant to NEPA and implementing regulations. Most recently, on March 1, 2000, Navy met with representatives of the FHWA and CALTRANS to discuss the proposed Memorandum Of Agreement under Section 106 of NHPA that addresses the historic resources on Yerba Buena Island.

At the meeting on March 1, 2000, Navy highlighted its responsibilities under Section 106 of the National Historic Preservation Act as well as the obligations imposed upon Navy by DBCRA. In particular, DBCRA requires Navy to support local redevelopment of base closure property and to closely consult with the Local Redevelopment Authority (which, for Naval Station Treasure Island, is the City of San Francisco) throughout the property disposal process.

Navy fully understands the importance of the SFOBB Safety Project to the San Francisco-Oakland Bay area and will continue to cooperate with the FHWA and CALTRANS. However, Navy cannot meet its obligations under the Federal laws noted earlier until San Francisco is included as a full partner with the Federal and State agencies dealing with the SFOBB Safety Project. This would include, for instance, San Francisco's full involvement in this consultation under Section 106 of NHPA. Without that involvement, the Section 106 process as presently scoped cannot be concluded.

If you have any questions concerning this matter, please contact Mr. Ron Plaseied, Treasure Island Base Closure Manager, at (619) 532-0986.

Sincerely,

G. J. BUCHANAN
Captain, CEC, USN
Commanding Officer

DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-5006

IN REPLY REFER TO:
March 28, 2000

Mr. David A. Nicol
Acting Division Administrator
Department of Transportation
Federal Highway Administration
Post Office Box 1915
Sacramento, CA 95812-1915

RE: SFOBB Section 106 Memorandum Of Agreement

Dear Mr. Nicol:

We appreciated the opportunity to meet with your staff and representatives of the California Department of Transportation to discuss issues arising out of the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project (SFOBB) proposed to be built on Navy property at Naval Station Treasure Island. Those discussions, while not part of the formal consultation process under Section 106 of the National Historic Preservation Act of 1966 (NHPA), did resolve some of the issues raised in my letter of February 18, 2000. Nevertheless, several significant issues remain outstanding.

First, in your letter of February 20, 2000, and during the discussions on March 1, 2000, you and your staff stated that the Federal Highway Administration (FHWA) has treated Navy as a cooperating agency under the National Environmental Policy Act of 1969 (NEPA) for the proposed bridge construction project. I must point out, however, that Navy has not been asked nor has it been given an opportunity to participate in the NEPA process for the proposed bridge construction as a cooperating agency as defined in the Council on Environmental Quality Regulations set forth at 40 CFR § 1501.6. In order for Navy to participate as a cooperating agency, a Memorandum Of Understanding (MOU) setting out the roles and responsibilities of each agency should be executed.

Second, it is essential that we clearly define in that MOU the distinct Federal undertakings concerning the proposed east span of the bridge, the historic district, and particular historic structures for which FHWA, Navy, and the Coast Guard, as appropriate, are responsible. Thus, we should incorporate provisions in the MOU, similar to Item 1 in your letter of

February 29, 2000, that define each Federal agency's undertakings. These provisions will ensure that all consulting parties and the public have a clear understanding of each agency's NHPA and NEPA obligations. To that end, we will provide you with language describing the scope of Navy's undertakings concerning the historic properties at Naval Station Treasure Island.

As one of the agencies with a Federal undertaking in this project, Navy must ensure that its NHPA and NEPA obligations are met. Navy cannot take any real estate actions regarding this property until we have satisfied our statutory obligations under NHPA and NEPA regarding the disposal of Naval Station Treasure Island. Additionally, the DBCRA requires Navy, as part of the NEPA process, to consider the economic viability of reuse proposals for this property. Thus, the economic viability of adaptively using the historic properties must be part of Navy's Section 106 consultation for any proposed use of the Treasure Island property. We expect to issue a NEPA Record Of Decision at the end of this year, but before we can do so, we must complete the NHPA Section 106 process.

Third, as we indicated at the meeting on March 1, 2000, Navy's undertakings extend beyond the mere granting of easements for the proposed bridge construction. As discussed in Navy's letter of November 23, 1998, commenting on the Draft Environmental Impact Statement (EIS), we must consult with the City and County of San Francisco, the Local Redevelopment Authority for Naval Station Treasure Island, before disposing of any property interest at the base. The FHWA's proposed action regarding bridge construction would require Navy to dispose of interests in that base closure property and in a manner that is inconsistent with the City's reuse plan for that property.

The Defense Base Closure and Realignment Act of 1990 (DBCRA), § 2905(b)(2)(D) and (b)(7)(K), requires Navy to consult with the Local Redevelopment Authority, give substantial deference to the reuse plan prepared by the Local Redevelopment Authority, and include that plan as part of Navy's proposed action for disposal and reuse of the closed base. Thus, we believe that the City of San Francisco must be a consulting party in this Section 106 process, if it chooses to do so.

The FHWA has stated its belief that the Advisory Council on Historic Preservation's revised implementing regulations for Section 106 of NHPA, 36 CFR Part 800, do not empower the City to be a party to the MOA. For the following reasons, we disagree

with that belief. As stated in my letter of February 18, 2000, Navy shares legislative jurisdiction with the City for the Naval Station Treasure Island property. The City is ". . . the local government with jurisdiction over the area in which the effects of an undertaking may occur" and thus is "entitled to participate as a consulting party." (36 CFR § 800.2(c)(4)). Further, it also has a "demonstrated interest . . . in the undertaking due to the nature of their legal or economic relation to the undertaking or affected properties, [and] their concern with the undertaking's effects on historic properties" (36 CFR Part 800.2.c.6). The City has demonstrated that interest by designating Treasure Island for military land use in the City's General Plan and for public use zoning in the City Planning Code; by preparing and approving a reuse plan that protects, preserves and adaptively uses Navy's historic properties; and by submitting comments on the Draft EIS describing the effects that the proposed bridge project would have on those historic properties and the impact that this project would have on the City's ability to adaptively use those properties.

Fourth, as agreed at the meeting on March 1, 2000, we look forward to receiving copies of all FHWA correspondence and materials inviting public participation in this process and other documentation concerning historic preservation issues, including comments received on the Draft EIS and responses to those comments. Please contact Melanie Ault at (619) 532-0954 or Ron Plaseied at (619) 532-0986 to schedule a consultation meeting with all parties.

Sincerely,

G. J. Buchanan

G. J. BUCHANAN
Captain, CEC, USN
Commanding Officer

cc: Lee Keatinge
Daniel Abeyta
Anne Marie Conroy
Denis J. Mulligan

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▸ 6

To Mr. Lee	From Bill Wong
Dept./Agency D-4	Phone # 916-498-5042
Fax # 510-286-6374	Fax # -5008

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Advisory Council On Historic Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

Mr. David A. Nicol
Acting Division Administrator
Federal Highway Administration
980 Ninth Street, Suite 400
Sacramento, CA 95814-2714

APR 19 2000

REF: San Francisco Oakland Bay Bridge Replacement
Memorandum of Agreement

Dear Mr. Nicol:

On February 11, 2000, the Council received your request for our execution of the referenced Memorandum of Agreement (MOA). We had also received an earlier draft of the agreement for our comment; however, as your staff was informed on several occasions, the Council was not prepared to offer our comments until we were able to take into account any comments that might be received from the other consulting parties, particularly the U.S. Navy. On February 22, 2000, this office received a facsimile copy of the Navy's comments which has allowed us to proceed with our consideration of the proposed MOA. Additional information has since been provided by your staff regarding the chronology of consultation.

We are satisfied to have FHWA acting as lead Federal agency for this project; however, we are concerned with level of coordination among other interested parties. The Council participated in the one meeting of consulting parties at which time the effects determinations had yet to be finalized and the chief topic of discussion was whether an "alternative neutral" approach would be acceptable. Coordination before that meeting and since appear to have been on a bilateral basis with individual agencies, providing no opportunity to identify issues of concern to the various consulting parties, much less achieve consensus as to appropriate mitigation. The proposed counterpart method of executing this agreement is a continuation of the bilateral approach and is not acceptable to the Council. We are aware that the proposed replacement of the eastern span of the San Francisco Oakland Bay Bridge has generated considerable public interest; therefore we would expect to see a greater level of participation from the public and other interested parties, including extending to the local governments the invitation to participate in the MOA as concurring parties. Because they have participated to some degree in consultation and are expected to cooperate in carrying out the terms of the agreement, we are recommending that the cities of San Francisco and Oakland be invited to concur in the terms of the agreement. Furthermore, as it is likely that San Francisco will become the property owner of record for at least a portion of the construction area during the period of construction, not including the city government at this time would be short-sighted.

The other concern with the conduct of consultation for this project is the consideration given Native American representatives. Provisions within the revised regulations give certain rights to federally recognized tribes; however, that is not to say that other groups are prevented from participating if they so request. As the Costanoan Rumsen Tribe has requested to participate as a consulting party, will be reviewing the Treatment Plan, and will possibly participate in monitoring data recovery at Archeological Site CASFr04/H, the Tribe should be invited to concur in the agreement to ensure their future cooperation. Provisions within the agreement for development of the Treatment Plan and treatment of human remains should be revised with Tribal input.

Second only to the demolition of the historic bridge itself, the source of greatest concern from an historic structure perspective is the proximity of the proposed new bridge to the Officer Quarters Historic District on Yuerba Buena Island and its attendant visual and audible impacts. It is our determination that the construction and operation of the replacement facility within the immediate proximity of the historic district itself constitutes an adverse effect. The appearance of the new bridge is of utmost concern in order to minimize its intrusion into the actual boundaries of the historic district, as well as to minimize the impact of its appearance on the larger setting. As we are unsure of the final design for the bridge, and given the prospective approach of this agreement, some provision must be included for subsequent review of the project plans to ensure its impact is minimized. Of concern from a historic preservation perspective would be the form, scale, materials of the bridge as well as lighting, signage, and accommodations for pedestrians

Finally, the proposed MOA often interchanges the terms "party" and "signatory". Under the terms of the revised regulations, signatory has a specific meaning. Accordingly, some attention must be paid to ensure that the appropriate term is used in the stipulations. We have noted specific instances in the attached recommendations for modification of the agreement. In addition to the issues raised above, we have a number of specific comments to offer on the proposed MOA, including many editorial changes which would improve the agreement by clarifying its intent and making the agreement easier to follow. These comments are contained within the separate attachment (enclosed).

We look forward to concluding this agreement with FHWA, the State Historic Preservation Officers, Caltrans and other consulting parties. Should you have any questions or wish to discuss this matter further, you may contact MaryAnn Naber at (202) 606-8505, or via e-mail at mnaber@achp.gov.

Sincerely,

David J. Klima
Director
Office of Planning and Review

Enclosure

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

May 19, 2000

IN REPLY REFER TO
HDA-CA
File #: 04-SF-80-12.2/14.0
Document #:P 31575

G. J. Buchanan, Captain, CEC,USN
Commanding Officer
Department of the Navy
Engineering Field Activity,West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno CA 94069-5008

Attention: Mr. Ron Plaseied, Base Closure Manager

Dear Captain Buchanan:

SUBJECT: SFOBB EAST SPAN SEISMIC SAFETY PROJECT MOA - RESPONSE TO NAVY MARCH 27, 2000 LETTER

We appreciate the time and thought your staff devoted to our meeting on March 1, 2000, and to a follow-up conference call on March 9, 2000, regarding the Memorandum of Agreement (MOA) for the proposed San Francisco Oakland Bay Bridge East Span Seismic Safety Project (Project). We believe these discussions have resulted in a better document. We have also now received your letter on the MOA dated March 27, 2000, and appreciate the thought and concern expressed in that letter. While we still have several issues to resolve, I believe we have established a working relationship through which resolution can be achieved.

We have moved forward on resolving many technical issues related to the MOA and have revised the MOA to include changes agreed to at the March 1, 2000, meeting. However, because we are still addressing comments on the MOA received from the ACHP, we are not able to send you a revised MOA at this time. As soon as we have a revised MOA, we will send it to you.

Since our meeting, we have thought further about parties to sign the MOA as concurring parties. The Navy had asked that the City and County of San Francisco (San Francisco) be invited to be a concurring party and the ACHP has asked that the City of Oakland and the Coastanoan Rumsen Carmel Tribe also be invited to concur in the terms of the MOA. We have decided to agree to these requests and will invite San Francisco, the City of Oakland and the Coastanoan Rumsen Carmel Tribe to concur in the terms of the MOA by signing the MOA as concurring parties.

Other unresolved issues revolve around the transfer of land for construction easements and operation of the east span of the San Francisco-Oakland Bay Bridge. We are preparing a package of materials to reinitiate the Federal Land Transfer process, originally begun in 1996. We will seek a transfer of land for both temporary construction easements and for permanent bridge operation under 23 U.S.C. § 107(d). Use of this provision for the Federal Land Transfer was agreed to by the Navy and the Department of Defense at a meeting held at the White House on May 5, 2000.

We would be happy to meet with you or hold another telephone conference to discuss project issues, at your request. If you need additional information or would like to arrange a telephone conference, please contact Robert Tally at (916) 498-5020 or Bill Wong at (916) 498-5042.

Sincerely,

/s/ Michael G. Ritchie

Michael G. Ritchie
Division Administrator

cc:
Daniel Abeyta, SHPO
John Fowler, ACHP
Denis Mulligan, Caltrans Dist. 4

cc (blind):
Ron Plaseid, Navy at San Diego address
Mara Melandry, Caltrans Dist. 4
Brian Smith, Caltrans HQ
Cindy Adams, Caltrans HQ
Margaret Buss, Caltrans HQ

cc (e-mail):
Karen Skelton, FHWA
Virginia Cherwek, FHWA
Gloria Shepard, FHWA
Bruce Eberle, FHWA
Fred Skaer, FHWA
Robert Tally, HA-CA
Bill Wong, HA-CA
Joan Bollman, HA-CA
Karen Schmidt, HPR-CA

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

May 26, 2000

(EXISTING #)
RECEIVED
HK MAY 31 2000

OHP
IN REPLY REFER TO
HDA-CA
File #: 04-SF-80-12.2/14.0
Document #: 32270
FHWA 980717A

CERTIFIED RETURN RECEIPT REQUESTED: Z-211-283-749

Mr. Daniel Abeyta
Acting State Historic Preservation Officer
Office of State Historic Preservation
P.O. Box 942896
Sacramento, CA 94296-0001

Dear Mr. Abeyta:

SUBJECT: **SFOBB Maritime ARCHEOLOGY: NO PROPERTIES**

Enclosed for your review is a copy of the Addendum Archaeological Survey Report - Maritime Archaeology for the San Francisco Oakland Bay Bridge East Span Seismic Safety Project (Project). This report completes the documentation of the results of maritime archaeological surveys within the Project's maritime area of potential effect (APE). By your December 1, 1999, letter, you concurred with our determination that there are no National Register eligible properties within the portion of the Project's maritime APE associated with the SFOBB East Span Seismic Safety Project - Pile Installation Demonstration Project. We have determined that there are no National Register eligible archeological sites located within the remainder of the Project maritime APE. We request your concurrence in this determination.

If you have any questions, please contact Joan Bollman at 498-5028.

Sincerely,

CONCUR: 6/6/00
Daniel Abeyta, Acting
State Historic Preservation Officer

For
Michael G. Ritchie
Division Administrator

Enclosure

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

June 13, 2000

IN REPLY REFER TO
HDA-CA
File #:04-SF-80-12.2/14.0
Document #:P 32467

Mr. Harry Yahata
District Director
Caltrans, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Dear Mr. Yahata:

SUBJECT: SFOBB: SHPO CONCURRENCE REGARDING MARITIME ARCHEOLOGY

Enclosed for your files is a copy of the State Historic Preservation Officer's June 6, 2000, concurrence in our determination that there are no National Register eligible archeological sites located within the remainder of the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project's maritime area of potential effect.

If you have any questions, please contact Joan Bollman at 916-498-5028.

Sincerely,

Joan Bollman

For
Michael G. Ritchie
Division Administrator

RECEIVED
JUN 19 2000
B. QUAN

Enclosure

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

June 23, 2000

IN REPLY REFER TO

HDA-CA
File #:04-SF-80-12.2.14.3KP
04-Ala-80-12.2/13.4
Document #:P32541

SEE ATTACHED LIST OF ADDRESSEES

Dear:

SUBJECT: SF BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT MOA

We are writing this letter to invite you to concur with the enclosed Memorandum of Agreement (MOA) for cultural resources for the San-Francisco-Oakland Bay Bridge East Span Seismic Safety Project. As you are probably aware, this is an important public safety project and has a high level of interest within the Bay Area.

The MOA was developed and signed by the Federal Highway Administration (FHWA), the United States Coast Guard, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation (ACHP) to address the bridge project's effects on cultural resources in compliance with Section 106 of the National Historic Preservation Act. As indicated in earlier Caltrans contact with you, one of the affected cultural resources is an archaeological site, CA-SFr-4/H. CA-SFr-4/H is located on Yerba Buena Island. Burials have been found at the site, the latest discovery was during the construction of the bridge in the 1930s. A map showing the project area on Yerba Buena Island and the approximate location of CA-SFr-4/H is enclosed for your information. Mitigation for project effects on CA-SFr-4/H will be addressed in a treatment plan which will be developed in accordance with Stipulation VII of the MOA.

The FHWA, as federal lead agency for the project, is now inviting members of the Ohlone Native American community identified as having potential interest in CA-SFr-4/H, the City and County of San Francisco, the City of Oakland, and the Navy to concur in the MOA. Because of your potential interest in impacts to archaeological site CA-SFr-4/H, you are being invited to concur in the MOA. Your signature as a concurring party would mean that you have read and understood the terms of the MOA and do not object to them. These invitations are made as permitted by the ACHP's regulations implementing Section 106 of the National Historic Preservation Act found in 36 CFR Part 800. While these regulations specify, that the refusal of any party invited to concur in the MOA does not invalidate the MOA, it is our hope that we can obtain your concurrence in the MOA

which, we believe addresses your concerns and demonstrates all parties' commitment to protect and preserve the integrity of the historic properties affected by the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project.

We are providing a copy of the MOA to you and to other parties with a request to indicate concurrence by signing in the indicated space and returning the signature page to this office by August 2, 2000. Enclosed is a self-addressed, stamped envelope for your use, if you have chosen to sign the MOA as a concurring party. After the above date, you will be sent a copy of the executed MOA with all the concurring party signatures that have been obtained within that time frame.

Whether or not you sign the MOA as a concurring party, Caltrans will continue to solicit your input in the development of the treatment plan as described in Stipulation VII of the MOA on FHWA's behalf. If you have any questions concerning the treatment plan, Native American coordination, or CA-SFr-4/H, please contact Janet Pape, Archaeology Manager – Toll Bridge Program, Caltrans at 510/286-5615 or e-mail her at Janet.Pape@dot.ca.gov. If you have any questions regarding the MOA, please contact Joan Bollman at 916-498-5028.

Sincerely,

/s/ David A. Nicol

For
Michael G. Ritchie
Division Administrator

Enclosures

cc:
Daniel Abeyta, SHPO
John Fowler, ACHP
Captain Robert Lachowsky, USCG
Captain G. J. Buchanan, Navy

SFOBB MOA OHLONE NATIVE AMERICAN CONTACTS

Ms. Rosemary Cambra, Chairperson
Muwekma Indian Tribe
503 A Vandell Way
Campbell, CA 95008

Mr. Tony Cerda, Chairperson
Coastanoan Rumsen Carmel Tribe
3929 Riverside Drive
Chino, CA 91710

Mr. Andrew Galvan
The Ohlone Indian Tribe
P.O. Box 3152
Mission San Jose, CA 94539

Ms. Jakki Kehl
5461 Beaver lane
Byron, CA 94514

Mr. Kenneth Marquis
4659 Bolero Drive
San Jose, CA 95111

Ms. Jenny Mousseaux (McLeod)
P.O. Box 610548
San Jose, CA 95161

Mr. Patrick Orozco
110 Dick Phelps Road
Watsonville, CA 95075

Ms. Katherine Erolinda Perez
1234 Luna Lane
Stockton, CA 95206

Mr. Alex Ramirez
520 South Van Ness Avenue
San Francisco, CA 94110

Mr. Rudy Rosales, Chairperson
Ohlone/Coastanoan-Esselen Nation
P.O. Box 301
Monterey, CA 93942

Ms. Ann Marie Sayers, Chairperson
Indian Canyon Mutsun Band of Coastanoan
P.O. Box 28
Hollister, CA 95024

Ms. Linda G. Yamane
1195 B Rousch Avenue
Seaside, CA 93955

Ms. Irene Zwierlein, Chairperson
Amah Tribal Band
789 Canada Road
Woodside, CA 94062

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

June 23, 2000

IN REPLY REFER TO

HDA-CA
File #:04-SF-80-12.2/14.3KP;
04-Ala-80-0.0/2.1
Document #: P32425

Honorable Willie Brown Jr.
Mayor, City and County of San Francisco
1 Dr. Carlton B. Goodlett Place
San Francisco CA 94102

Dear Mayor Brown:

SUBJECT: SF-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT MOA

Enclosed is a copy of the alternative-neutral Memorandum of Agreement (MOA) for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. The MOA was recently executed by the Federal Highway Administration (FHWA), the United States Coast Guard, the Advisory Council on Historic Preservation (ACHP), and the State Office of Historic Preservation in conformance with Section 106 of the National Historic Preservation Act. For your information, I have enclosed a copy of the letter from the ACHP to FHWA in which the ACHP indicates that by carrying out the terms of the MOA, FHWA will have fulfilled its responsibilities under Section 106.

The MOA is the result of extensive consultation under the Section 106 process. We appreciate your participation in the consultation process leading to the execution of the MOA by your attendance at various meetings and the comments you provided.

By this letter, I invite the City and County of San Francisco to concur in the MOA. By separate letters, I am also inviting the City of Oakland, the Navy, and members of the Ohlone Native American community to be concurring parties. These invitations are made as permitted by the ACHP's regulations implementing Section 106 of the National Historic Preservation Act found in 36 CFR Part 800. While these regulations specify, at 36 CFR § 800.6(c)(3), that the refusal of any party invited to concur in the MOA does not invalidate the MOA, it is my hope that we can obtain your concurrence in the MOA which, we believe addresses your comments and concerns and demonstrates

all parties' commitment to protect and preserve the integrity of the historic properties affected by the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. Of course, because this MOA is alternative neutral, it does not commit any of the signers to a specific outcome or alternative, nor does it favor any particular alternative. Instead, it commits the signers to identified measures to mitigate the project's effects on historic properties. Because of the City and County of San Francisco's interest in preserving the historic properties on Yerba Buena Island, I hope you will join us in this important step. If you have any questions concerning the MOA, please do not hesitate to contact me.

I am providing a copy of the MOA to you and to other invited parties with a request to sign in the indicated space and return the signature page by August 2, 2000. After that date, you will be sent a copy of the executed MOA with all the concurring party signatures that have been obtained within the above time frame.

FHWA will consult further with you to fulfill the stipulations of the MOA whether or not you sign the MOA as a concurring party. We look forward to your participation in such future consultations. If you have any questions, please call me at 916-498-5001 or Joan Bollman at 916-498-5028.

Sincerely,

/s/ David A. Nicol

For
Michael G. Ritchie
Division Administrator

Enclosures

cc:
Daniel Abeyta, SHPO
John Fowler, ACHP
Captain Robert Lachowsky, USCG
Captain G. J. Buchanan, Navy

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

June 23, 2000

IN REPLY REFER TO

HDA-CA
File #:04-SF-80-12.2/14.3
04-Ala-80-0.0/2.1
Document #: P32540

Captain G.J. Buchanan, Captain, CEC, Navy
Commanding Officer
Department of the Navy
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Dr.
San Bruno CA 94066-5006

Attention: Ron Plaseied

Dear Captain Buchanan:

SUBJECT: SF-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT MOA

Enclosed is a copy of the alternative-neutral Memorandum of Agreement (MOA) for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. The MOA was recently executed by the Federal Highway Administration (FHWA), the United States Coast Guard, the Advisory Council on Historic Preservation (ACHP), and the State Office of Historic Preservation in conformance with Section 106 of the National Historic Preservation Act. For your information, I have enclosed a copy of the letter from the ACHP to FHWA in which the ACHP indicates that by carrying out the terms of the MOA, FHWA will have fulfilled its responsibilities under Section 106.

The MOA is the result of extensive consultation under the Section 106 process. We appreciate your participation in the consultation process leading to the execution of the MOA by your attendance at various meetings and the comments you provided.

By this letter, I invite the Navy to concur in the MOA. By separate letters (copies enclosed), I am also inviting the City and County of San Francisco, the City of Oakland, and members of the Ohlone Native American community to be concurring parties. These invitations are made as permitted by the ACHP's regulations implementing Section 106 of the National Historic Preservation Act found in 36 CFR Part 800. While these regulations specify, at 36 CFR § 800.6(c)(3), that the refusal of any

party invited to concur in the MOA does not invalidate the MOA, it is my hope that we can obtain your concurrence in the MOA which, we believe addresses your comments and concerns and demonstrates all parties' commitment to protect and preserve the integrity of the historic properties affected by the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. Of course, because this MOA is alternative neutral, it does not commit any of the signers to a specific outcome or alternative, nor does it favor any particular alternative. Instead, it commits the signers to identified measures to mitigate the project's effects on historic properties. Because of the Navy's interest in preserving the historic properties on Yerba Buena Island, I hope you will join us in this important step. If you have any questions concerning the MOA, please do not hesitate to contact me.

I am providing a copy of the MOA to you and to other invited parties with a request to sign in the indicated space and return the signature page to this office by August 2, 2000. After that date, you will be sent a copy of the executed MOA with all the concurring party signatures that have been obtained within above time frame.

FHWA will consult further with you to fulfill the stipulations of the MOA whether or not you sign the MOA as a concurring party. We look forward to your participation in such future consultations. If you have any questions, please call me at 916-498-5001 or Joan Bollman at 916-498-5028.

Sincerely,

/s/ David A. Nicol

For
Michael G. Ritchie
Division Administrator

Enclosures

cc:
Daniel Abeyta, SHPO
John Fowler, ACHP
Captain Robert Lachowsky, USCG

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

June 23, 2000

IN REPLY REFER TO
HDA-CA
File #:04-SF-80-12.2/14.3KP;
04-Ala-80-0.0/2.1
Document #: P32539

Honorable Jerry Brown
Mayor, City of Oakland
250 Frank Ogawa Plaza, City Hall
Oakland CA 94612

Dear Mayor Brown:

SUBJECT: SF-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT MOA

Enclosed is a copy of the alternative-neutral Memorandum of Agreement (MOA) for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. The MOA was recently executed by the Federal Highway Administration (FHWA), the United States Coast Guard, the Advisory Council on Historic Preservation (ACHP), and the State Office of Historic Preservation in conformance with Section 106 of the National Historic Preservation Act. For your information, I have enclosed a copy of the letter from the ACHP to FHWA in which the ACHP indicates that by carrying out the terms of the MOA, FHWA will have fulfilled its responsibilities under Section 106.

The MOA is the result of extensive consultation under the Section 106 process. We appreciate your participation in the consultation process leading to the execution of the MOA by your attendance at various meetings and the comments you provided to.

By this letter, I invite the City of Oakland to concur in the MOA. By separate letters, I am also inviting the City and County of San Francisco, the Navy and members of the Ohlone Native American community to be concurring parties. These invitations are made as permitted by the ACHP's regulations implementing Section 106 of the National Historic Preservation Act found in 36 CFR Part 800. While these regulations specify, at 36 CFR § 800.6(c)(3), that the refusal of any party invited to concur in the MOA does not invalidate the MOA, it is my hope that we can obtain your concurrence in the MOA which, we believe addresses your comments and concerns and demonstrates all parties' commitment to protect and preserve the integrity of the historic properties affected by the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. Of course, because this MOA

is alternative neutral, it does not commit any of the signers to a specific outcome or alternative, nor does it favor any particular alternative. Instead, it commits the signers to identified measures to mitigate the project's effects on historic properties. Because of the City of Oakland's interest in preserving historic properties within its area of jurisdiction, I hope you will join us in this important step. If you have any questions concerning the MOA, please do not hesitate to contact me.

I am providing a copy of the MOA to you and to other invited parties with a request to sign in the indicated space and return the signature page by August 1, 2000. After that date, you will be sent a copy of the executed MOA with all the concurring party signatures that have been obtained within the time frame.

FHWA will consult further with you to fulfill the stipulations of the MOA whether or not you sign the MOA as a concurring party. We look forward to your participation in such future consultations. If you have any questions, please call me at 916-498-5001 or Joan Bollman at 916-498-5028.

Sincerely,

/s/ David A. Nicol

For
Michael G. Ritchie
Division Administrator

Enclosures

cc:
Daniel Abeyta, SHPO
John Fowler, ACHP
Captain Robert Lachowsky, USCG
Captain G. J. Buchanan, Navy

Specifically, we have the following concerns with the MOA. Please amend the MOA to include the following:

- There is no III. G. included in the document.

- III B. 1. Create permanent interpretive exhibits to document the bridge building history in the Bay Area located in the Touchdown Park.

- In addition, create a permanent center in Oakland for the public, schools, etc. to house histories, videos, models, etc. (see letter dated Jan. 14, 1998). Operations to be funded with an endowment from Caltrans/FHWA.

- III C. 1&2. Provide the Oakland Museum of California with the information and displays as necessary to provide an exhibit (with traveling potential) of museum quality, as deemed appropriate by the Oakland Museum. The Oakland Museum is the appropriate place to display an exhibit on the history and engineering of major bridges in the Bay Area.

- III D. Since the Oakland Museum of California is dedicated specifically to the history of California and the City of Oakland has been most affected by the East Span Seismic Safety project, the Oakland Museum shall be given first right of refusal for permanent curation and display of exhibit materials.

- III F.1. Caltrans shall provide a free copy of the documentary video and to the Oakland Museum.

- The Key Pier Substation and electrical substation were not mentioned in the document. At a minimum the document needs to include sections on protective measures, repair of inadvertent damage, a historic structure report, monitoring and enforcement etc. to ensure the property is maintained during the Project.

- Rehabilitate and reuse the Key Pier Substation to house the permanent interpretive exhibits.

- Should there be a new bridge, the design of the new bridge should evoke the same innovative first-class status that the historic one does.

- Provide a landmark feature as the gateway to Oakland.

- Commission a large-scale oil painting of the Eastern Span of the historic Bay Bridge.

- Restore the Toll Plaza clock for permanent display at the park, Toll Plaza or museum.

- Produce a publication based on HAER documentation.

- Historical markers at the Oakland anchorage park and along the bicycle pedestrian path on the bridge.

In sum, the historic Bay Bridge has been instrumental in shaping the City of Oakland and is listed on the National Register of Historic Places. As such, we believe that it is important to perpetuate the cultural, architectural and technical significance of the Bay Bridge, by providing serious lasting mitigation measures that reflect the size, scale and significance of the Bay Bridge.

:cifically, we have the following concerns with the MOA. Please amend the MOA to include the owing:

A. There is no III. G. included in the document.

III B. 1. Create permanent interpretive exhibits to document the bridge building history in the Bay Area located in the Touchdown Park.

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- Produce a publication based on HAER documentation.
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In sum, the historic Bay Bridge has been instrumental in shaping the City of Oakland and is listed on the National Register of Historic Places. As such, we believe that it is important to perpetuate the cultural, architectural and technical significance of the Bay Bridge, by providing serious lasting mitigation measures that reflect the size, scale and significance of the Bay Bridge.

As stated previously, we do not believe that this executed MOA complies with the Section 106 requirement for consultations with interested parties and therefore request that the document be rescinded and ulated for further consultation.

Please continue to keep us informed by way of the Project Manager, Diane Tannenwald, at the Public Works Agency, 250 Frank H. Ogawa Plaza, Suite 4314, Oakland, CA 94612-2033, telephone (510) 238-6386.

Thank you,

Robert C. Bobb
City Manager

c: Capt. Robert Lachowsky, United States Coast Guard
Daniel Abeyta, California State Office of Historic Preservation
John Fowler, Advisory Council on Historic Preservation
Mara Melandry, Caltrans
Leslie Gould, Planning Department
Claudette Ford, Public Works Agency
Helaine Kaplan-Prentice, Landmarks Preservation Board
Mark Wald, Office of the City Attorney

Attachments and meetings:

Landmarks Preservation Advisory Board Meeting, July 1997
Landmarks Preservation Advisory Board Meeting, September 1997
Letter dated January 14, 1998
Meeting dated July 3, 1998
Meeting dated December 10, 1998
Meeting dated February 2, 1999
Meeting dated February 2, 1999
Draft MOA January 22, 1999

DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-5006

IN REPLY REFER TO:
11000
Ser:00/010
4 Aug 00

Michael G. Ritchie
Division Administrator
U.S. Department of Transportation
Federal Highway Administration, California Division
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

Dear Mr. Ritchie:

The Department of the Navy has given careful consideration to your letter of June 23, 2000, asking the Department to concur in the proposed Memorandum Of Agreement (MOA) for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. Notwithstanding the fact that some of the parties have already signed the MOA, we do not believe that it is appropriate or prudent to execute a Memorandum Of Agreement concerning construction of the San Francisco Bay Bridge East Span Seismic Safety Project until the design study that the U.S. Army Corps of Engineers is conducting has been completed and its report issued. As recognized by all parties when the design study was undertaken, the current design and associated construction plans could materially change as a result of the study's findings and conclusions. Any material change in the design or construction plan will likely require revision of the MOA.

Additionally, we do not agree that participation as a concurring party discharges Navy's responsibilities under the National Historic Preservation Act of 1966 (NHPA). Any action by the Department of the Navy to transfer property to support bridge construction, whether in response to a request made pursuant to 23 U.S.C. Section 107(d) or other authority, constitutes an undertaking under the National Historic Preservation Act. The underpinnings of Navy's undertaking are expressly recognized in the MOA: Paragraph 5 recognizes the Department of the Navy's jurisdiction over the property; Paragraph 6 recognizes the need for the Department of the Navy to assign title to the Federal Highway Administration; and Paragraph 8 recognizes that the land transfer and bridge construction may adversely affect historic properties listed or eligible for listing on the National Register of Historic Places, including Navy Building 262, the Naval Officers' Quarters Historic District, and archeological site CA-SFr-04/H.

The Section 106 requirement that the Department of the Navy consult with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) regarding such an undertaking is very clear. To discharge its responsibilities under Section 106 as the owner of the historic properties affected by the proposed construction, the Department of the Navy must be a signatory to the MOA prepared by the Federal Highway Administration and must be given an appropriate oversight role similar to that currently provided for the ACHP and the SHPO or must undertake its own consultation process.

We look forward to working with you to address these issues.

Our point of contact for this project is Mr. Ron Plaseied, Base Closure Manager. He may be reached at (619) 532-0986.

Sincerely,

G.J. BUCHANAN
CAPT, CEC, USN
COMMANDING OFFICER

State of California The Resources Agency

Memorandum

: Ms. Mara Melandry
Department of Transportation
District 4 Toll Bridge Program
Post Office Box 23660
Oakland, California 94623-0660

Date: August 8, 2000

From : **Department of Fish and Game - Post Office Box 47, Yountville, California 94599**

Subject : San Francisco - Oakland Bay Bridge East Span, Review of the Biological Assessment

Department of Fish and Game personnel have reviewed the Biological Assessment submitted for the above-referenced project. The American peregrine falcon (*Falco peregrinus anatum*) is a State-listed endangered species which may be impacted by the proposed project. Since this species is also listed as a fully protected species under Fish and Game Code Section 3511, the Department cannot issue an incidental take permit for this species pursuant to Section 2081. All activities associated with the bridge project, therefore, need to be designed to avoid take of this species. To avoid take, the Department recommends the Department of Transportation develop a Management Plan that addresses American peregrine falcon and other bridge nesting species of concern. The Management Plan should discuss all bridge construction, removal, and maintenance activities and develop schedules for activities to avoid take during critical nesting periods and take of individuals. The Management Plan should be developed in consultation with the Department and should be approved by the Department prior to implementation.

The project may also affect State-listed fish species including the State endangered winter-run chinook salmon (*Oncorhynchus tshawytscha*) and state threatened spring-run chinook salmon (*Oncorhynchus tshawytscha*). Based on the project location; mitigation measures in the Biological Assessment and the June 21, 1999 memorandum to Ms. Mara Melandry; and the determination of "not likely to adversely affect" from the National Marine Fisheries Service, the Department concludes that the project, as proposed, will not result in take of chinook salmon and a 2081 permit is not required for this project. If the project changes to include blasting or other activities that may significantly impact fisheries, the Department should be contacted to re-initiate consultation.

Department personnel will continue to work with your staff to develop appropriate mitigation measures for non-listed species and other biological resources of concern. If you have any questions, please contact Mr. Scott Wilson, Environmental Specialist, at (707) 944-5529; or Mr. Carl Wilcox, Habitat Conservation Manager, at (707) 944-5525.

Robert W. Floerke
Regional Manager
Central Coast Region

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

September 25, 2000

IN REPLY REFER TO

HDA-CA
File #:04-SF-80-12.2/14,3
Document #: P33279

Mr. Robert C. Bobb
City Manager
City of Oakland
1 Frank Ogawa Place
Oakland CA 94612

Dear Mr. Bobb:

SUBJECT: SFOBB MOA: RESPONSE TO CITY'S JULY 26, 2000, LETTER

Thank you for your letter of July 26, 2000, regarding the Memorandum of Agreement under Section 106 of the National Historic Preservation Act for the San Francisco Oakland Bay Bridge. We appreciate your continued interest in this important seismic safety project.

You requested that the Memorandum of Agreement be revised to include various additional mitigation measures. As we explained in our letter of June 23, 2000, which transmitted the Memorandum of Agreement to your office, the Memorandum of Agreement has already been executed by the legally required signatory agencies. Because you participated in the development of the mitigation program, you were invited to concur with the stipulations of the Memorandum of Agreement.

In October 1999 and January 2000, Caltrans provided you with copies of the report titled "Consideration of Proposed Mitigation Measures." This report included the draft Memorandum of Agreement. The measures your agency suggested are included in the report with an explanation as to why they were or were not being pursued. Caltrans solicited your input. At both times, no written response was received from the City. We then proceeded to finalize consultation with consulting parties that provided comments and with the signatory agencies and executed the Memorandum of Agreement.

We note that some of the mitigation measures you mentioned are included in the Memorandum of Agreement (for example the restoration of the toll plaza clock, Stipulation III.B.1, or the

development of a museum exhibit about the bridge, Stipulation III.C.1). Otherwise, any of your suggestions that were excluded were evaluated in the "Consideration of Proposed Mitigation Measures" for their appropriateness as mitigation of effects on historic properties. The signatory parties, the Federal Highway Administration, Coast Guard, State Historic Preservation Officer, and Advisory Council on Historic Preservation, had a copy of the report "Consideration of Proposed Mitigation Measures" and were aware of your proposals, as well as those of other interested parties. The mitigation measures included in the Memorandum of Agreement are those that the signatory parties felt were appropriate as mitigation of the project's effects on historic properties and justifiable as public expenditures.

Given the careful consideration of the signatory parties of the mitigation measures, we do not believe there is reason to rescind and recirculate the Memorandum of Agreement.

If you have further questions or concerns regarding the project Memorandum of Agreement, please contact Joan Bollman at 916-498-5028 or Bill Wong at 916-498-5042.

Sincerely,

/s/ C.Glenn Clinton

For
Michael G. Ritchie
Division Administrator

cc:
Daniel Abeyto, SHPO, w/cpy of 7/26/00 ltr, w/attach as received
John Fowler, ACHP w/cpy of 7/26/00 ltr, w/attach as received
Commander Robert Lachowsky, USCG w/cpy of 7/26/00 ltr, w/attach as received
Mara Melandry, Caltrans District 4, Toll Bridge Program
Cindy Adams, Caltrans HQ, Environmental Division
Margaret Buss, Caltrans HQ, Environmental Division
Tony Anziano, Caltrans District 4, Legal Office
Steve Hulsebus, Caltrans District 4, Toll Bridge Program

cc: (E-mail)
Sara Purcell, HCC-WE
Michael G. Ritchie, HDA-CA
David Nicol, HDA-CA
Glenn Clinton, HA-CA
Bill Wong, HA-CA
Joan Bollman, HA-CA

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

REPLY TO
ATTENTION OF:

OCT 31 2000

Regulatory Branch(1145b)

SUBJECT: File Number 23013: San Francisco-Oakland Bay Bridge

Dennis Mulligan
California Department of Transportation
111 Grand Avenue
Oakland, California 94623

Dear Mr. Mulligan:

The U.S. Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, San Francisco Bay Regional Water Quality Control Board, and the Corps of Engineers, have completed their review of the sediment test results and supplemental information for the approximately 418,000 cubic yards of sediments proposed to be dredged from the construction of the San Francisco-Oakland Bay Bridge East Span replacement project located between Yerba Buena Island and the City of Oakland in Alameda and San Francisco Counties, California. The test results and supplemental information reviewed are as follows:

1. The test results as presented in the report prepared by California Department of Transportation District 04 (Caltrans) and Geocon Consultants, Inc. entitled "Sediment Sampling and Analysis Report San Francisco-Oakland Bay Bridge East Span Seismic Safety Project Alameda and San Francisco Counties, California" Volumes 1 and 2 dated June 2000.

2. The Sampling and Analysis Plan (SAP) as presented in the report prepared by California Department of Transportation District 04 and Geocon Consultants, Inc. entitled "Amended Sampling and Analysis Plan San Francisco-Oakland Bay Bridge East Span Seismic Safety Project Alameda and San Francisco Counties, California" dated June 2000.

3. The letter from the California Department of Transportation District 04 addressed to the U.S. Army Corps of Engineers dated October 4, 2000, which provided additional information and clarification of the test results.

The members of the above inter-agency group are recommending to their respective agency's management that the material proposed for dredging from the San Francisco-Oakland Bay Bridge East Span replacement project, as characterized in the above report and supplemental information, is suitable for disposal as shown in the enclosed Table with the following comments and conditions:

1. The agencies found that there were numerous oversights by personnel during the sampling and testing. For example, the bioassays for the reference sediments from Tubbs Island and Paradise Cove were not analyzed at the same time as the bioassays from the proposed dredge sites.

2. Please note that because a sediment is found suitable for disposal at a particular location does not necessarily mean that the material can be disposed at that location. The selection of the disposal sites should be coordinated with the agencies during the permitting process. Disposal site selection needs to take into account the factors (implementability, effects and cost) and decision-making criteria in your Dredged Material Management Plan along with the suitability determination in the enclosed Table.

3. The Alcatraz Disposal Site (SF-11) is a dispersive disposal site and only material that will disperse can be disposed at SF-11. Because your material is new work and not maintenance material, any material found during dredging that is of a nature that will not easily disperse (rock, gravel, heavily consolidated material) may not be disposed at this site. An alternative disposal option will need to be found for any non-dispersive material.

4. The material below 12 feet depth (measured from top of sediment) in sample locations SFOBB-N-1 through SFOBB-N-7 is considered not to have been exposed to contaminants and has been granted an exclusion from testing by the agencies. Therefore, even though samples SFOBB-N-1, SFOBB-N-2 and SFOBB-N-5 are unsuitable for aquatic disposal, the material below 12 feet is considered suitable for disposal at the San Francisco Deep Ocean Disposal Site (SF-DODS) and (depending on grain size, etc.) suitable for in-bay disposal at SF-11. Because the agencies maintain data on the volumes of material suitable for different disposal locations, the agencies request that Caltrans provide the volume of material below the 12 foot level, as described above, for these three sites.

5. Material from Sites SFOBB-N-2, SFOBB-N-5 and Access-N-5 is not suitable for unconfined aquatic disposal because of significant solid phase toxicity to Nephtys when compared to the reference sites. However, no amphipods exhibited significant toxicity in these samples. The agencies note that it is unusual to find significant solid phase toxicity to Nephtys and a high survival in Ampelisca (e.g., the for Access-N-5 amphipod toxicity tests showed 100% survival in all five replicates). It is possible there could have been some confounding factors involved in the toxicity to Nephtys, but none were described or discussed in the report. Because of the volumes involved (especially Access-N-5), Caltrans may want to consider testing these sites at a higher resolution. The agencies would not require bioaccumulation testing for this higher resolution testing. Caltrans should submit any proposal for additional testing to the agencies for approval prior to the start of sampling or testing.

6. The reason the material from Site SFOBB-N-1 is unsuitable for unconfined aquatic disposal (ocean and SF-11) and wetland surface is the excessive bioaccumulation of individual constituents of polynuclear aromatic hydrocarbons (PAHs).

Please be advised that this letter does not constitute an authorization to proceed with your dredge project. You must first obtain Federal, State and local permits as appropriate.

Should you have any questions please call or write Mr. David Dwinell of our Operations and Readiness Division (415-977-8471), and refer to the file number at the head of this letter.

Sincerely,

ORIGINAL SIGNED
By
Calvin C. Fong
For
Max R. Blodgett
Chief, Operations and
Readiness Division

Enclosure

Copies Furnished:

US EPA, San Francisco, CA, Attn: Dadey
CA BCDC, San Francisco, CA, Attn: Goldbeck
CA RWQCB, Oakland, CA, Attn: Collins
CA SLC, Sacramento, CA, Attn: Howe
CA F&G, Menlo Park, CA, Attn: Ota
US NMFS, Santa Rosa, CA, Attn: Mulvey

SF-Oakland Bay Bridge

Suitability Determination						
DU ID	Volume (CY)	Ocean	Wetland Surface *	SUAD	Wetland Foundation *	Construction Fill *
SFOBB-N-1	4,208				X	X
SFOBB-N-2	12,227				X	X
SFOBB-N-3	13,955	X	X	X	X	X
SFOBB-N-4	7,751	X	X	X	X	X
SFOBB-N-5	2,016				X	X
SFOBB-N-6	4,473	X	X	X	X	X
SFOBB-N-7	4,871	X	X	X	X	X
Access-N-1	72,876	X	X	X	X	X
Access-N-2	73,591	X	X	X	X	X
Access-N-3	73,703	X	X	X	X	X
Access-N-4	73,461	X	X	X	X	X
Access-N-5	74,371				X	X
Total	417,503	324,681	324,681	324,681	417,503	417,503

* May be suitable for use, depending on the characteristics of the proposed disposal sites and project specifications. For Wetland Foundation and Construction fill, an additional analysis of the leaching potential of the sediments, using a modified waste extraction test (WET), may be necessary to determine final suitability.

DATE: 7 December 2000

Joseph Nicoletti
Chairman
Engineering and Design Advisory Panel, MTC

FROM: Report of the Ad Hoc Committee on Seismic Ground Motions
Members: Bruce A. Bolt, Chairman
Norman Abrahamson
Roger Borcherdt
Joseph Penzien

RE: **Final Report**
Evaluation Assessment of Proposed Alternatives to Retrofit/Replace the East Span of the San Francisco-Oakland Bay Bridge
U.S. Army Corps of Engineers, October 27, 2000

Dear Mr. Nicoletti:

1. CHARGE AND DEFINITIONS

As Chairman of the EDAP, you requested that the Ad Hoc Committee (AHC) review and comment on the discussion and recommendations on seismic ground motions contained in the **Final Report** of the U.S. Army Corps of Engineers. Members of the AHC have read thoroughly the **Final Report**; the Committee met on Thursday, 2 November 2000, at the offices of International Civil Engineering Consultants, Inc. (ICEC) to discuss aspects that relate to earthquake ground motion and members have consulted since that time.

In the "Executive Summary" of that **Final Report** on page 4, there is the conclusion that "The performance of the replacement bridge during a Maximum Credible Earthquake (MCE) cannot be determined. The bridge has not been evaluated or designed for a MCE event, which is larger than the SEE event." On page 23 of the **Final Report**

there is the summary recommendation that "the bridge should be evaluated for a design that addresses the San Andreas MCE ground motions. These ground motions appear to be more forceful than the SEE ground motions in the period range significant to the bridge." In the sections below, the AHC addresses the argument behind the above recommendation and clarifies the concerns expressed in it.

Initially, it is appropriate to define the concepts of Maximum Credible Earthquake (MCE) and Safety Evaluation Earthquake (SEE). Both of these concepts are referred to throughout the COE **Final Report.** In this respect it is appropriate to refer back to the Report to the Director of the Department of Transportation by its Seismic Advisory Board (George W. Housner, Chairman), October 1994, entitled, *The Continuing Challenge*. This report was written as a result of the Northridge earthquake of January 17, 1994. On page 6 on Table 1.1 the concept of "**Safety Evaluation Ground Motion**" for important bridges is defined: "Up to two methods of defining ground motion may be used

- Deterministically assessed ground motions from the maximum earthquake as defined as by the Division of Mines and Geology, Open File Report 92-1 (1992).
- Probabilistically assessed ground motions with a long-return period (approximately 1000-2000 years)."

Table 1.1 goes on to state that "for important bridges both methods shall be given consideration... For all other bridges, the motions shall only be based on the deterministic evaluation." Because of the importance of the East Bay Crossing, both methods were considered in estimating the appropriate ground motions for dynamic analysis and design of the replacement bridge. In essentials, the above two evaluation

methods represent, respectively, the MCE and SEE earthquake characterization referred to in the COE **Final Report**.

Considerable discussion of these definitions is given in a seminal report by Geomatrix Consultants, Inc. entitled, "Seismic Ground Motion Study for West Bay San Francisco Bay Bridge," contract no. 59N772, March 1992. This report is referred to below as GEO92. A second key report is "Seismic Ground Motion Report for San Francisco-Oakland Bay Bridge, East Span Seismic Safety Project," prepared by Fugro/Earth Mechanics, 1998. This report is referred to below as FU98.

We wish to emphasize that in recent years there has been a strong trend toward the second method of assessment mentioned above for large critical structures (see Yeats, Sieh, and Allen, "The Geology of Earthquakes", Oxford, 1997, pg. 45). Two crucial reasons are first, the difficulty in setting any objective non-statistical basis for the selection of a so-called Maximum Credible Earthquake, and second, by deaggregation of each hazard component, the alternative estimation method (i.e. using the SEE concept) allows explicitly consideration of the specific sources and site. Implicitly, special attention may be given to the type of structure to which the hazard study applies; the known range of significant periods of structural vibrations can guide the effort expended on the estimation of realistic and relevant ground motion characteristics, such as the source directivity effect (see below).

The time-line used in the discussion in the COE **Final Report** (e.g. pages 20-21) may indicate lack of awareness of a revision of the ground motions that followed a 1998 review by the AHC. This revision was important because it included development and

application of the effect of source directivity on ground motion. This incorporation in the project went well beyond standard practice.

2. RECOMMENDATIONS AND ARGUMENTS IN THE COE FINAL REPORT

The key discussion on ground motions is on pages 20-21 of the COE **Final Report**. It hinges on a figure entitled "Response Spectra." This figure is reproduced in this report as Figure R1. First, we note that the ground motions discussed are for the rock basement and not for the soil above, which interacts with the bridge foundations. Secondly, a small drafting correction is needed to the dashed line in Figure R1 entitled "SA 84th MCE". Points for periods 0.7 to 1.7 sec have been plotted incorrectly in the COE **Final Report** by scaling from Figure 2-5 of FU98. The correct spectrum has been recalculated for this AHC review from the original numerical values and is shown by the heavy dashed curve in Figure R2 where it can be compared with the SEE curve (heavy full line). This comparison shows that at periods of less than 1 sec (i.e., corresponding to the higher-frequency bridge responses), the SEE spectral accelerations are stronger than those of the corrected MCE spectrum. For periods between 1 and 2.5 sec the curves are virtually identical, within the uncertainties. At longer periods, the corrected "SA 84th MCE (augmented)" spectrum lies slightly above the SEE curve (in agreement with the statement on page 21 of the COE **Final Report**).

It is critical to know, however, that the curve labeled "SA 84th MCE" in Figure R1 (and "SA 84th MCE (augmented)" in Figure R2) is not, in fact, a standard MCE curve (with some average directivity effects included), used regularly in practice to establish seismic hazard for critical structures. As explained in the commentary in FU98 (page 2.5), the referenced curve drawn in Figures R1 and R2 is the standard MCE curve

"augmented by forward directivity effects", assuming the most unfavorable rupture direction. Realistic seismological source modelling requires instead the incorporation of the directivity direction towards and away from the bridge in a probabilistic way. Strong motion recordings have shown that this latter correction is significant at periods greater than about 1 sec for sites within about 15 km of the causative fault rupture. The consequences of directivity have been widely discussed in recent hazard assessments and it was deliberately included in the final East Bay Crossing ground motion estimation of the SEE response spectrum and, even more critically, in the selected time histories (the effect of the directivity pulse and "fling").

The above clarification has important consequences. In the COE **Final Report**, page 21, the statement is made "for this replacement bridge with its inherent period, the MCE is a greater force than the SEE." On the contrary it follows from the correct selection of the MCE curve that this statement needs revision in two crucial ways. First, when the standard 84th percentile MCE curve is plotted against the SEE curve, as shown in Figure R2, it is clear that the MCE spectral accelerations fall well below the SEE curve at all relevant periods. The augmented MCE spectrum shown in Figures R1 and R2 was considered in FU98 only because the hazard analysis went beyond standard practice.

Secondly, in a full analysis application of the seismic hazard, it is not sufficient to consider "an inherent period" for the replacement bridge, but rather all crucial response periods of the bridge. In this regard, the longer periods of significance are critical response periods of the tower (approximately 2.3 sec), and fundamental periods of the highest piers of the viaduct (maximum values up to 2.7 sec). As will be seen in Figure R2, in this period range the SEE spectral acceleration values (with directivity effects)

exceed those of the standard 84th percentile MCE. In addition, the corrected comparison in Figure R3 (revision of plot in COE **Final Report** Appendix 6) between displacement spectra for the standard San Andreas 84th percentile MCE and the adopted 1500-year SEE yields a similar result.

3. CONCLUDING REMARKS

In summary, the AHC concludes that the ground motions defined by the SEE response spectra adopted for the replacement bridge design and shown in Figures R1, R2 and R3 exceed the San Andreas MCE ground motions defined by standard practice at all periods of engineering relevance. Contrary to the statement in Conclusion No. 7 (page 4) of the COE **Final Report**, the replacement bridge has been designed and evaluated for ground motions that are larger than those from the recognized standard MCE approach. There also appears to be no reason to re-discuss the probabilistic basis for the SEE, the argument for which has been fully documented in FU98 and elsewhere.

Finally, we draw attention to a recent development in seismic hazard computations. As you know, response spectra (estimated for earthquakes of various magnitudes and for various source-to-site distances) depend crucially on the measurement of ground motions in actual earthquakes. As additional recordings become available from newly occurring large earthquakes, these new ground motion recordings are incorporated into the existing database; revised attenuation curves are then calculated. In the assessment of the MCE and SEE discussed in the reports GEO92 and FU98, a number of then current attenuation curves were used to allow inclusion of uncertainties. In 1999 two large earthquakes produced additional strong-motion recordings, namely, the Izmit, Turkey, earthquake of 17 August 1999 and the Chi-chi, Taiwan, earthquake of 20

September 1999, with magnitude 7.1 and 7.4, respectively. The observations from these earthquakes have now been included by N. Abrahamson in a preliminary set of revised attenuation curves shown in Figure R4. These updated curves, even allowing for their tentative nature, indicate a reduction in the ground motion attenuation relations (i.e. increased attenuation) compared with those used in the earlier studies for the San Francisco-Oakland bridge. It is at least very likely that any future re-evaluations of the adopted ground motions for the replacement East Bay Crossing that incorporate these up-to-date ground motion data, would lead to response spectra (for both the MCE and SEE methods) with somewhat lower spectral acceleration values than those adopted.

Bruce C. Bolt — B.A. Bolt, Chairman

Norman Abrahamson

Roger Borcherdt

Joseph Penzien

Response Spectra

FIGURE R1

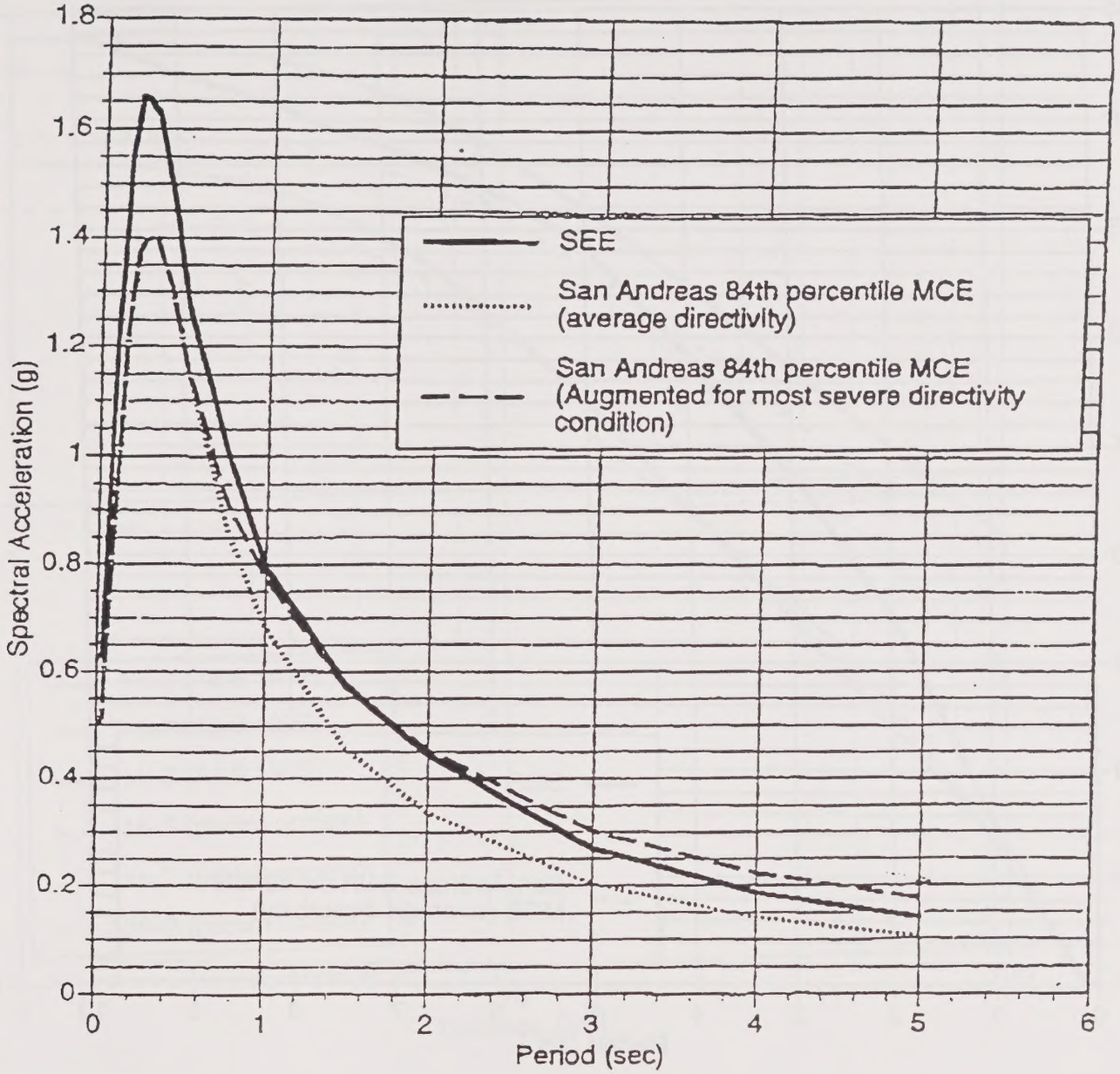
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Spectral Acceleration (g)
0
1
2
3
4
5
6
Period (sec)
SEE
San Andreas 84th percentile MCE (average directivity)
San Andreas 84th percentile MCE (Augmented for most severe directivity condition)

FIGURE R2

9

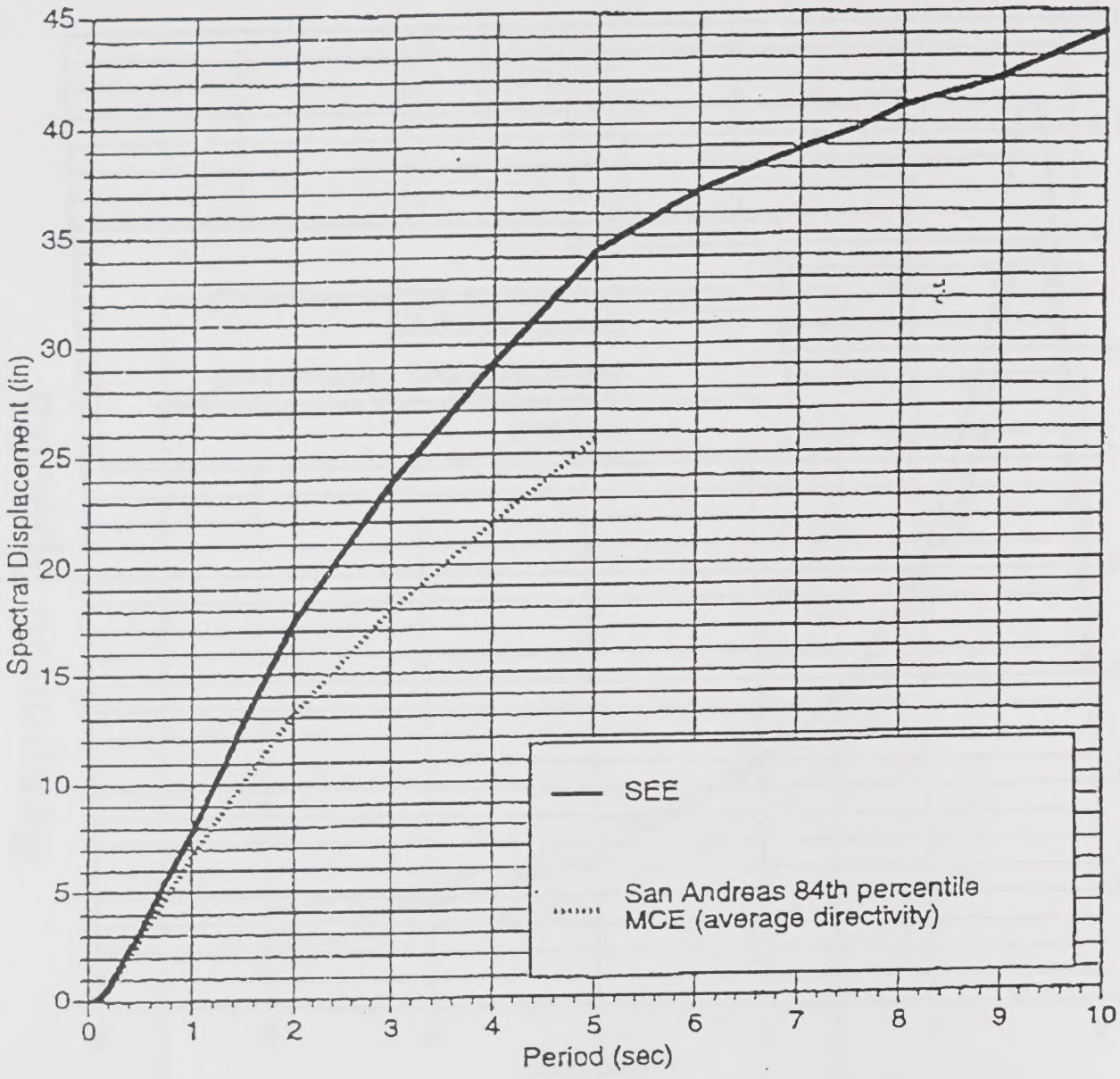
Spectral Displacement (in)
Period (sec)
SEE
San Andreas 84th percentile MCE (average directivity)

FIGURE R3

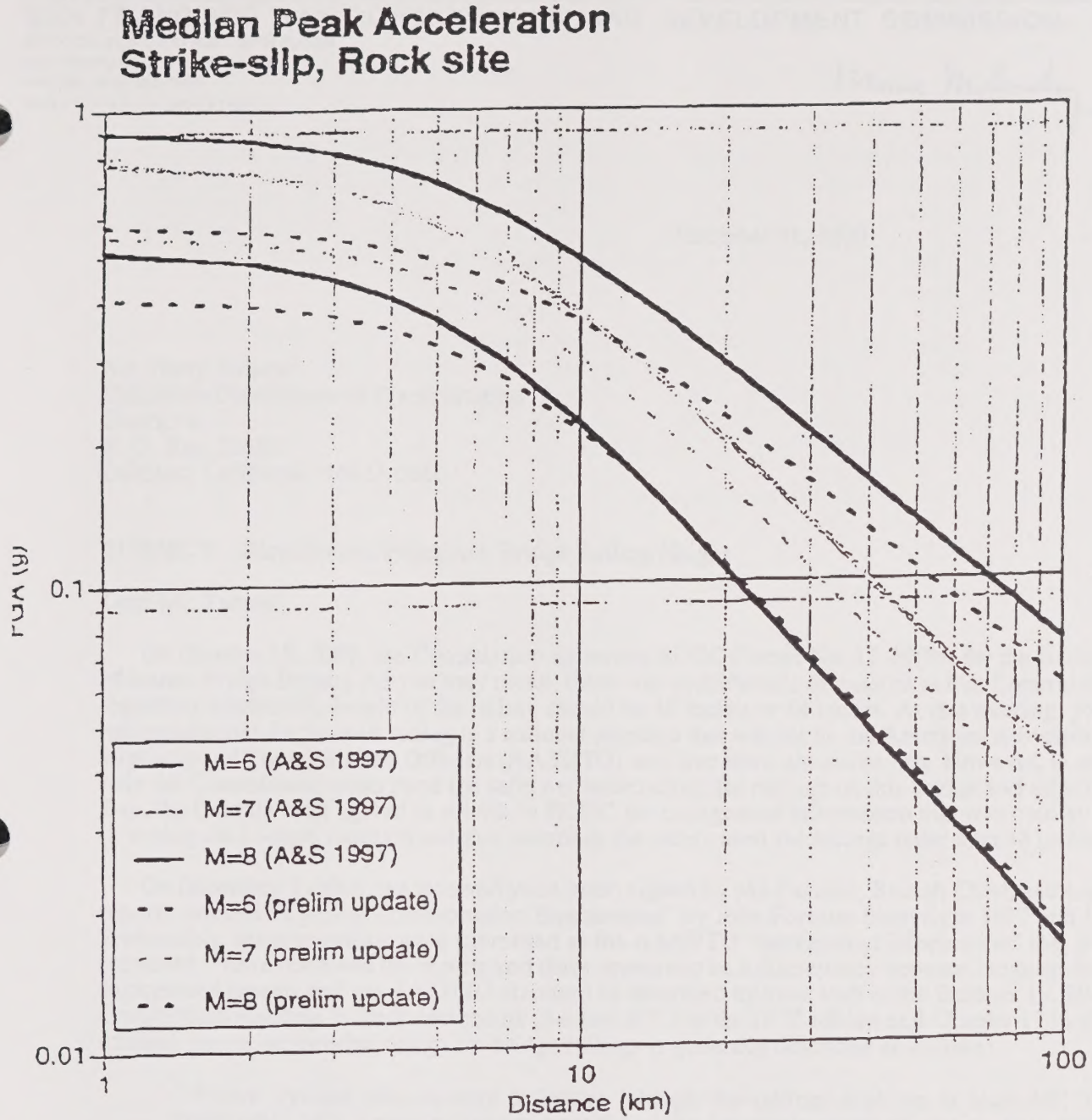
Median Peak Acceleration
Strike-slip, Rock site
PGA (g)
1
0.1
0.01
1
10
100
Distance (km)
M=6 (A&S 1997)
M=7 (A&S 1997)
M=8 (A&S 1997)
M=6 (prelim update)
M=7 (prelim update)
M=8 (prelim update)

FIGURE R4

STATE OF CALIFORNIA GRAY DAVIS, Governor

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
FIFTY CALIFORNIA STREET, 26TH FLOOR
SAN FRANCISCO, CALIFORNIA 94111
PHONE: (415) 352-3600
http://ceres.ca.gov/bcdc/

Maria Melendrez

bcdc Celebrating 35 Years

December 21, 2000

RECEIVED
DEC 22 2000
B. QUAN

Mr. Harry Yahata
California Department of Transportation
District 4
P. O. Box 23660
Oakland, California 94623-0660

SUBJECT: Bicyclist and Pedestrian Bridge Railing Height

Dear Mr. Yahata:

On October 19, 2000, the Commission approved BCDC Permit No. 17-99(M) for the Benicia-Martinez Bridge Project. As you may recall, there was considerable discussion at that Commission meeting regarding whether the height of the railing should be 48 inches or 54 inches. At that meeting, your staff maintained that the 54-inch railing is a national standard that was set by the American Association of State Highway and Transportation Officials (AASHTO) and, therefore, should be met. However, in an effort to help the Commission understand the safety considerations for railings on this bridge and others around the Bay, the Caltrans staff agreed to submit to BCDC the background information that was used by AASHTO in setting the 54-inch standard and that describes the safety need for railings taller than 48 inches.

On December 7, 2000, we received your letter, signed by Mo Pazooki, Branch Chief, and copies of two reports, entitled "Cycling Transportation Engineering" by John Forester (copyright 1977 and 1983). Presumably, these materials were submitted as the AASHTO "background information" that BCDC requested. I have reviewed the reports and there appears to be a discrepancy between language in the background reports and the AASHTO standard as described by your staff at the October 19, 2000 Commission meeting. In both documents (Section 3.7.2 in the 1977 edition and Chapter 17 in the 1983 edition), the recommended design for bridge railings is generally described as follows:

> "Where cyclists ride adjacent to bridge railings, the railings shall be at least 48" high (preferably 54"). Lower railings contact the cyclist below his center of gravity, thus tending to topple him over the railing instead of preventing him from going over."

Recently, we have received public letters of support for a 48-inch railing on the proposed San Francisco-Oakland Bay Bridge East Span project (see attached). Enhanced views for pathway users and bridge motorists are stated as the reason for the preference for a lower railing. As you know, the Bay Plan's policies on Appearance, Design, and Scenic views state that "...new or remodeled bridges across the Bay should be designed to permit maximum viewing of the Bay and its surroundings by both motorists and pedestrians. Guardrails and bridge supports should be designed with views in mind." Therefore, we feel that it is important for us to clearly understand this issue. Currently, it is unclear to us why bicycle railings on bridges along State of California highways must be 54 inches when the background report that informed AASHTO's "standard" states that railings on bridges "shall be at least 48 inches."

Further, the 1999 AASHTO Guide for the Development of Bicycle Facilities clearly states that "[r]ailings, fences or barriers on both sides of a path on a structure [such as an overpass, underpass, bridge or bicycle facility on a highway bridge] should be a minimum of 1.1 m (42 inches) high."

Finally, although the Commission approved a 54-inch railing for the Benicia-Martinez Bridge, it appears, given these apparent discrepancies, that the information on which the Commission relied may not have been completely accurate. Based on this unresolved issue, the BCDC staff and the Commission's Design Review Board have not yet accepted the railing height for the Carquinez Bridge and, given the public's concern on this topic, the railing issue is likely to be raised when the Commission considers the Bay Bridge East Span project.

Please know that we are clearly committed to ensuring safe public access facilities around the Bay for both pedestrians and bicyclists. However, BCDC must also ensure that each and every project meets the intent of the Commission's laws and policies. Therefore, please provide us with any additional background materials that led to the adoption of the 54-inch rail height standard. In the absence of other supporting evidence, we will want to continue our discussions regarding appropriate bridge rail heights.

If you have any questions or comments, please don't hesitate to contact Brad McCrea of our staff.

Sincerely,

WILL TRAVIS
Executive Director

WT/ra
Enclosures
cc: Denis Mulligan

Copies to Anziano, Maroney, Chang, Dickinson, Hulsebus, Akinsanya, Mara, Clive Endress, Wiecha, Pazooki, Topping, Mike Thomas

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January 22, 2001

Rob Lawrence
U.S. Army Corps of Engineers
San Francisco District
LESPN-CO-R
333 Market Street, 8th Floor
San Francisco, CA 94105-2197

and

Rebecca Tuden
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105-3301

Subject: Conceptual Mitigation Plan For Special Aquatic Sites; San Francisco-Oakland Bay Bridge Seismic Safety Project; ACOE File No. 23013

Dear Mr. Lawrence and Ms. Tuden:

Thank you for reviewing the Conceptual Mitigation Plan for Special Aquatic Sites dated November 2000 for the San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project. Your preliminary agreement with the plan is necessary for the Federal Highway Administration (FHWA) to issue the Final Environmental Impact Statement (FEIS) for this important seismic safety project. This seismic safety project is a top priority for Governor Gray Davis who has established that the project should be under construction by early summer of 2001. Therefore, your preliminary agreement on the Conceptual Mitigation Plan is vital in meeting the Governor's schedule and providing seismic safety to the Bay Area.

We appreciate your suggestions for improving the Conceptual Mitigation Plan. We understand Caltrans must address several issues with respect to the plan before the U.S. Army Corps of Engineers (COE) and the U.S. Environmental Protection Agency (USEPA) will concur on the adequacy of the plan pursuant to the MOU for the NEPA/404 integration process. We anticipate that the information below will address your concerns and that the COE and USEPA will be able to issue their preliminary agreement on the Conceptual Mitigation Plan.

2000 Eelgrass Pre-Construction Survey

Caltrans recently completed a pre-construction survey for the risk design, Replacement Alternative N-6. The physical survey was conducted in October 2000, with data generation and review being completed only recently. This survey has a limited purpose as opposed to prior surveys: it is a pre-construction survey intended to provide current data immediately prior to construction of a particular alternative to measure actual impacts to the greatest extent possible. Accordingly, this survey only covers the area impacted by Replacement Alternative N-6. Since the survey was not intended for the purposes of an alternatives analysis, it did not include areas impacted by other alternatives.

As anticipated, the area occupied by the eelgrass beds at Yerba Buena Island (YBI) and the Oakland Touchdown Area (OTA) has changed due to the natural annual variability in such beds (see Exhibits A and B). The OTA beds have grown. At present, it appears that Replacement Alternative N-6 will permanently impact 1.29 hectares (3.19 acres) of eelgrass and temporarily impact 0.14 hectares (0.35 acres) at the OTA. The eelgrass beds at YBI have also grown. At present, it appears that Replacement Alternative N-6 will permanently impact 0.04 hectares (0.10 acres) of eelgrass at YBI; no temporary impacts to eelgrass beds at YBI are expected. As the eelgrass beds have grown at OTA and YBI between 1999 and 2000, the overall percentage of area impacted has not changed to any appreciable degree.

Sand Flats

On the basis of the 2000 eelgrass survey and additional design data, Caltrans has re-evaluated the project impacts to sand flats. Overall, permanent and temporary impacts to sand flats that would result from Replacement Alternative N-6 have been reduced (see Exhibit A). At present, it appears that Replacement Alternative N-6 will permanently impact 1.45 hectares (3.58 acres) of sand flats and temporarily impact 0.56 hectares (1.38 acres) at the OTA.

Revised Mitigation Proposal

To offset the impacts to eelgrass identified in the 2000 eelgrass survey and the impacts to sand flats, Caltrans will provide more mitigation than was proposed in the Conceptual Mitigation Plan previously provided to you (see Exhibits E and F). Caltrans now proposes to provide approximately 26.05 hectares (64.35 acres) of a tidal marsh ecosystem at the mitigation site including:

- 0.41 hectares (1.01 acres) of new mudflats;
- 0.83 hectares (2.05 acres) of new tidal marsh channels;
- 9.25 hectares (22.86 acres) of new tidal marsh;
- 2.41 hectares (5.94 acres) of enhanced uplands;
- 9.87 hectares (24.39 acres) of enhanced jurisdictional wetlands; and
- 3.28 hectares (8.10) of existing intertidal areas.

This approach is consistent with Caltrans' current proposal for off-site mitigation, which provides replacement at a 3 to 1 ratio. Caltrans will continue to provide on-site mitigation as proposed in the Conceptual Mitigation Plan. The Interagency Group has already agreed that off-site and out-of-kind mitigation is acceptable for impacts to eelgrass and sand flats.

While the COE expressed some concern regarding the consistency of the acreage described in the Conceptual Mitigation Plan, the issue has been resolved by the changes precipitated by the 2000 eelgrass pre-construction survey. When Caltrans prepares a Final Mitigation Plan that reflects the 2000 eelgrass survey and the additional mitigation, we will ensure that the acreage is consistent.

Existing Wetlands

While Caltrans' primary goal is habitat creation, the revised mitigation proposal, as described on page two, would enhance approximately 9.87 hectare (24.39 acres) of existing jurisdictional wetlands by introducing additional tidal action (see Exhibit C). Enhancement of existing wetlands is now included as part of the revised conceptual mitigation proposal. Caltrans will create approximately 10.49 hectares (25.92 acres) of mudflats, tidal channels and tidal marsh from existing uplands. Approximately 0.15 hectare (0.37 acres) of existing jurisdictional wetlands would be converted to mudflats at the mouth of each tidal channel.

Buffer Zone/Setback

Of the 26.05 hectares (64.35 acres) of tidal marsh ecosystem, Caltrans will provide approximately 1.69 hectares (4.19 acres) as a 100-foot-wide buffer/setback between the mitigation site and adjacent uses. The buffer/setback will be in addition to the mudflats, tidal channels and tidal marsh and would consist of enhanced uplands and wetlands.

Providing a vegetated upland buffer around the entire mitigation site would require filling jurisdictional wetlands. Therefore, in areas where there are existing wetlands, Caltrans will provide a 100-foot-wide setback from adjacent land uses. Caltrans has concluded that a 100-foot-wide buffer/setback is sufficient to protect the functions and values of the mitigation site for wildlife and water quality from any adjacent uses.

Acquisition of Mitigation Rights

Caltrans will acquire a sufficient amount of uplands and existing wetlands at an appropriate site, such as the Breuner property, to create 26.05 hectares (64.35 acres) of tidal marsh ecosystem as described above. The property interest will either be a fee or an easement that is sufficient to create mudflats, tidal channels, and tidal marsh, to enhance uplands and existing jurisdictional wetlands, to protect existing intertidal areas and to provide a 100-foot-wide buffer/setback from the surrounding uses.

At the Oakland Touchdown Area, Caltrans will use its existing right-of-way and acquire additional right-of-way and/or temporary construction easements from the Port of Oakland. This fee and

easement will allow Caltrans to construct the project and to implement on-site restoration of eelgrass and sand flats. Caltrans will obtain any necessary right of entry permits from the Port of Oakland for monitoring and maintenance of on-site restoration.

Caltrans' Role in Mitigation Bank

Caltrans has concluded that it should not be a participant in a mitigation bank because of the uncertainty in developing the bank and gaining regulatory approval. Given the lack of regional consensus and the controversial nature of such programs, Caltrans is concerned that its participation would delay the East Span Project. However, Caltrans will coordinate with all necessary parties to ensure that its mitigation program is implemented in a manner consistent with other related mitigation projects.

Public Access

Caltrans is providing a bicycle and pedestrian path, several belvederes, and a public access staging area with parking as part of the East Span Project. These public access facilities are a significant investment and are unprecedented in the Bay Area in terms of cost. Caltrans does not propose any public access at, through or around its mitigation area; public access is inconsistent with providing high quality habitat for resident and migratory wildlife. Further, the proposed mitigation does not create a need or a demand for public access nor does it adversely affect existing public access.

Providing a Bay Trail extension by a path or elevated boardwalk in the location identified by BCDC would require placing fill in existing jurisdictional wetlands and areas that Caltrans proposes to enhance. The Bay Trail Alignment Policies, as established by the Association of Bay Area Governments, recognize the importance of wildlife areas and wetlands. The Policies state that the trail alignment should "minimize impacts and conflicts with sensitive areas." With respect to wetlands, the Policies state that "alternate routes should be provided where necessary and additional buffering/transition areas designed to protect wetland habitats should be provided where appropriate to protect wildlife." Therefore, Caltrans has concluded that it should not provide public access at the proposed mitigation site.

On-Site Monitoring Program

On-site eelgrass restoration will require additional design and engineering to be most effective and to maximize colonization of eelgrass in the restored barge access channel. While pilot transplanting efforts have been successfully performed in association with the Middle Harbor Enhancement Area (MHEA) for the Port of Oakland and the COE, additional data on the Emeryville Flats eelgrass beds and physical environment are necessary to optimize the design of the eelgrass restoration program. Caltrans will collect additional physical and biological data on both adjacent and reference area bed dynamics during the next three years; this will allow for adjustments in the final design of the access channel restoration to optimize conditions for colonization by eelgrass. Factors that may be adjusted in

the design of the restored access channel include:

- Surface topography;
- Extent of backfill encroachment into the bridge's shading zone; and
- Thickness of the surface cap and side slope incline.

After implementation of the on-site restoration, Caltrans will monitor the eelgrass restoration areas for a period of ten years and submit consolidated reports to state and federal permitting agencies. The monitoring program will allow both an early assessment and long-term evaluation of the restoration of the barge access channel. This will include assessments conducted at 0 mo., 3 mo., 6 mo., 12 mo. (1 yr.), 24 mo. (2 yr.), 36 mo. (3 yr.), 48 mo. (4 yr.), 60 mo. (5 yr.), 84 mo. (7 yr.), and 120 mo. (10 yr.). Surveys conducted at 0, 3, and 6 months would principally be to evaluate growth and survival parameters of planting units, seedling recruitment to the restoration area, and site stability. This differs from the monitoring that would be conducted at subsequent planting period anniversaries; they will be used to examine overall eelgrass coverage and density within the restoration area.

Success criteria for eelgrass colonization will reflect both the dynamic nature of this habitat and the paucity of longitudinal data necessary to establish trends and patterns of eelgrass growth in San Francisco Bay. Caltrans has used the aerial coverage and density of eelgrass habitat to determine project impacts. These parameters are regularly used to assess eelgrass habitats, including restoration success. The monitoring methods will remain consistent between pre-construction assessment and monitoring, and post-construction assessment. This is especially important given the high turbidity levels in the bay and sparse occurrence of eelgrass, both of which generate a high variability in eelgrass bed dynamics between sampling methods.

The 2000 eelgrass pre-construction survey shows that eelgrass beds within the project area are highly dynamic. Accordingly, restoration of the barge access channel will be evaluated against the normal variability observed in the natural eelgrass beds. This will be accomplished using natural reference areas that exhibit similar characteristics to those found within the original impact area and the restoration area. For the pre-construction survey, Caltrans used a reference area located north of the project site within the same larger Emeryville Flats eelgrass bed and a small bed within Clipper Cove. An external reference area, such as the Bayfarm Island shoals, will also be used to gauge how eelgrass at the Emeryville Flats is performing relative to other Central Bay eelgrass beds.

The area of the barge access channel that is available for restoration is limited to the footprint of the channel that falls outside the shade zone of the replacement bridge. As such, the criteria for success will be based on establishing eelgrass habitat, at a density comparable to that of habitat impacted, over a substantial portion of the filled channel. Within the MHEA, the success criteria were based on establishment of eelgrass over one third of the area determined to be suitable to support this habitat. This relatively modest goal was established based on recognition of both the lack of local eelgrass restoration history and the narrow range of conditions that would be suitable for eelgrass growth. Because the entire top of the restored barge access channel would be designed to support eelgrass, one third of this area should support eelgrass at or above the density of the impact area in order for the

restoration to be deemed successful. However, recognizing the highly dynamic nature of the eelgrass beds on the Emeryville Flats, including those within the project's impact area, the performance of restoration for the East Span Project will also be tied to the performance of native eelgrass beds in the reference areas. If eelgrass expands or declines within the reference area, similar dynamics would be expected within the restoration area.

Monitoring the mitigation area will include an examination of coverage and density using a standardized set of monitoring tools (side-scan sonar) and methods. In addition to assessing site performance relative to success criteria, early site development conditions (physical and biological) will be examined to identify required corrective actions. Factors of light, turbidity, and sediment erosion and accretion will be measured following initial construction to determine when the site can be planted with eelgrass. Following site stabilization and planting, eelgrass planting unit growth and survival and natural recruitment will be monitored following planting to evaluate long-term habitat establishment at the site. These monitoring elements will be useful in determining why portions of the site may not be successful in the short-term or long-term.

Off-site Monitoring Program

Caltrans will also monitor the mitigation site for a period of ten years and submit consolidated reports every other year to state and federal permitting agencies. The performance of the proposed mitigation site will be based on a reference location that will serve as a control site for the targeted habitats. Caltrans will use Giant Marsh at Point Pinole as a reference marsh for developing a more detailed mitigation plan and success criteria. Monitoring will be conducted to evaluate the performance of the created habitats with respect to the success criteria established for targeted habitats. Success criteria for tidal marsh habitats will focus on the goals of increased diversity and abundance of native tidal marsh species and increased area of tidal marsh habitats.

Monitoring at the mitigation site will consist of qualitative and quantitative methods designed to assess the following biophysical parameters:

- Survival and persistence of individual plantings;
- Tidal hydrology;
- Sedimentation rates;
- Channel dimensions;
- Species composition;
- Vegetation cover; and
- Species diversity.

Proposed monitoring methods for the mitigation site will include photo stations, line transects, sample plots, and observation of species' composition and abundance. Data will be collected from the mitigation site and from the reference location.

Success criteria will be measured by percentage increases in the target habitat from year to year. Emphasis will be placed on measuring success by the continual increase in size and density of the target habitats. The increase in size and density will chart a trend towards ultimate success. This is more effective than establishing predicted yearly rates of increase in size and density that may not reflect site-specific conditions that control growth and vigor.

Long Term Management

After acquiring a property interest and implementing the mitigation plan at the site, Caltrans will establish a conservation easement for open space and wildlife purposes to protect the site in perpetuity. Caltrans will then transfer the property to another public agency experienced in resource management. Likely candidates include the East Bay Regional Park District, the California Department of Fish and Game, or the United States Fish and Wildlife Service. An agreement between Caltrans and another public agency to manage the mitigation site will be negotiated. The negotiations would establish a time period in which funding would be provided for the activities described below:

- Provide corrective action to ensure the site functions as a tidal marsh ecosystem;
- Control exotic non-native plant species;
- Remove litter and debris from the mitigation site;
- Maintain necessary fences, signage or other structures; and
- Comply with state or federal permitting requirements.

Implementation Schedule

According to the Governor's schedule, the Skyway contract will be the first order of work and will commence in the early summer of 2001. No impacts to special aquatic sites would occur with construction of the Skyway. As part of the fill portion of the Oakland Approach contract, the surcharge and the geo-tube for the westbound roadway would be placed in late summer of 2001. This fill would impact sand flats. Barge docks at YBI for the Main Span contract would be constructed in the summer of 2002. The westernmost barge dock would impact eelgrass beds. Dredging the barge access channel for the Oakland Approach contract would occur in the spring of 2003. This would impact eelgrass beds and sand flats. Construction of structures for the Oakland Approach contract would occur in the summer of 2003. This would impact sand flats due to shading.

On-site mitigation and restoration would take place in three phases. The first phase involves harvesting portions of the eelgrass from the barge access channel in the early summer of 2001 prior to any construction activities (this work may be delayed until fall of 2001 to complete another eelgrass survey). The eelgrass would then be immediately replanted in adjacent areas outside the construction zone. The second phase would involve constructing the rock slope protection and transitional habitat; this would occur at the end of project completion in spring of 2006. The third phase would involve restoring portions of the barge access channel and portions of the sand flats, also in the spring of 2006. Caltrans' goal is to implement off-site mitigation before or concurrent with the project impacts.

On-Site Mitigation/Removal of Existing Bridge

The removal of the existing bridge would provide very limited opportunities for on-site mitigation. The water beneath the existing bridge is generally too deep to support eelgrass habitat or sand flats without manipulating the bathymetry by adding fill. Moreover, the currents are too strong along this section of the Oakland Touchdown to establish eelgrass. At several interagency meetings, Caltrans was discouraged from filling the Bay to create new eelgrass habitat. At project completion, Caltrans may declare the uplands beneath and south of the existing bridge excess to transportation needs. If so, the property will revert automatically to the Port of Oakland as provided for in the original deeds. There is a regional desire to develop a park at the Oakland Touchdown Area. While it would be possible to excavate the upland and create some aquatic habitat at this location, it may be of little value as it would be isolated from larger tracts of eelgrass, wetlands and sand flats. It would be located near the park, which is envisioned to have intensive public use. Finally, the new eastbound roadway, Caltrans' maintenance road and several historic buildings would surround portions of the habitat, thereby providing little opportunity for sufficient transitional uplands. Based on these constraints, Caltrans has concluded that the area made available by the removal of the existing bridge is not suitable for on-site mitigation and that providing larger areas of mitigation at the Breuner site contiguous with existing wetlands would provide greater habitat values.

We hope this information satisfies your concerns and that you can now provide preliminary agreement that the project's Conceptual Mitigation Plan and implementation schedule are adequate. We look forward to having a response by February 5, 2001.

Thank you for assistance with this critical project. If you have any questions or concerns, please call me at (510) 286-5582 or Jeff Jensen at (510) 622-8729.

Sincerely,

HARRY Y. YAHATA
District Director

by

Mara Melandry

MARA MELANDRY
SFOBB Environmental Manager

c:	Bill Wong	(Federal Highway Administration) with enc.
	James Bybee	(National Marine Fisheries Service) with enc.
	Keith Lichten	(Regional Water Quality Control Board) with enc.
	Richard Smith	(United States Fish and Wildlife Service) with enc.
	Wayne S. White	(United States Fish and Wildlife Service) with enc.
	Jerry Bielfeldt	(United States Fish and Wildlife Service) with enc.
	Peter Baye	(United States Fish and Wildlife Service) with enc.
	Steve McAdam	(Bay Conservation and Development Commission) with enc.
	Robert Batha	(Bay Conservation and Development Commission) with enc.
	Lee Huo	(Bay Conservation and Development Commission) with enc.
	Donna Turchie	(Federal Transit Administration) w/o
	Calvin Fong	(United States Army Corps of Engineers) w/o
	Captain Robert Lachowsky	(United States Coast Guard) w/o
	Felicia Marcus	(United States Environmental Protection Agency) w/o
	Deanna Wieman	(United States Environmental Protection Agency) w/o
	David Farrel	(United States Environmental Protection Agency) w/o
	Tim Vendlinski	(United States Environmental Protection Agency) w/o
	Nova Blajez	(United States Environmental Protection Agency) w/o
	Kathy Dadey	(United States Environmental Protection Agency) w/o
	Becky Ota	(California Department of Fish and Game) with enc.
	Scott Wilson	(California Department of Fish and Game) with enc.

bc:

Steve Hulsebus	(District 4 Toll Bridge)	w/ enc.
Mara Melandry	(District 4 Toll Bridge)	w/ enc.
Cindy Adams	(HQ Environmental Program)	w/ enc.
Mike Davis	(Jones and Stokes)	w/ enc.
Tony Anziano	(D-4 Legal)	w/o
Ivy Edmonds-Hess	(Parsons-Brinckerhoff)	w/ enc.

File: EA 012000
KP Ala 80.0.0/2.09
SF 80 12.23/14.32
SFOBB East Span Project

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February 14, 2001

Mr. Rob Lawrence
US Army Corps of Engineers
San Francisco District, CESPN-CO-R
333 Market St., 8th Fl.
San Francisco CA 94105-2197

Subject: San Francisco Oakland Bay Bridge East Span Seismic Safety Project
Army Corps of Engineers File No. 23013S

Dear Mr. Lawrence:

At the request of the Federal Highway Administration (FHWA), Caltrans is pleased to transmit to you a copy of the Administrative Final Environmental Impact Statement (FEIS)/Statutory Exemption for the East Span Seismic Safety Project. Also enclosed are responses to the comments received on the Draft Environmental Impact Statement from your agency and from the Environmental Protection Agency (EPA). The volume of all comments and responses and the volume of figures are not included due to time constraints. The FEIS and responses to comments reflect the Army Corps of Engineers' (ACOE's) recent concurrences on the Least Environmentally Damaging Practicable Alternative and conceptual mitigation; we have not yet received EPA's concurrences.

Caltrans and FHWA have addressed the ACOE's comments on the DEIS. Your agency's major concerns were the disposal of dredged materials and testing of the sediments for suitability of certain disposal options. These concerns were addressed in the Dredged Materials Management Plan, circulated June 1999, the Sampling and Analysis Report, June 2000, and the Dredged Material Management Office's response, October 2000. The plan also addressed related issues such as air quality. Responses to comments on the Plan will be in the FEIS, with responses to comments on the DEIS.

As FHWA noted via telephone, we are anticipating that you can provide any comments on the document and letters by February 22, 2001. The very brief time allotted for review is necessary to stay on the expedited schedule set for this project. Hand-written comments on the document itself are acceptable and preferable for ease of any necessary revisions. Please note that this is a document under development, and as such it cannot be released to the public, pursuant to the Freedom of Information Act (FOIA) Exemption 5; see 5 U.S.C. 552(b)(5). Please call Mara Melandry at 510-286-5582 when you have completed your review. We appreciate your prompt attention and continuing assistance with this important seismic safety project.

Sincerely,

HARRY Y. YAHATA
District Director

by:

Marilee Mortenson

for MARA MELANDRY
Environmental Manager, SFOBB

cc: Calvin Fong (Army Corps of Engineers)
Deanna Wieman (Environmental Protection Agency)
Lisa Hanf (Environmental Protection Agency)
Tim Vendlinkski (Environmental Protection Agency)
Kathy Dadey (Environmental Protection Agency)

Nova Blajez	(Environmental Protection Agency)
Rebecca Tuden	(Environmental Protection Agency)
Mike Monroe	(Environmental Protection Agency)

bc:

Denis J. Mulligan	(Toll Bridge Program)
Steve Hulsebus	(Toll Bridge Program)
Tony Anziano	(D-4 Legal)
Mara Melandry	(Toll Bridge Program)
Cindy Adams	(HQ Environmental Division; Mail Station 27)
Sara Purcell	(FHWA-Western Regional Center)
Bill Wong	(FHWA-California Division)
Ivy Edmonds-Hess	(Parsons-Brinckerhoff)
Mike Davis	(Jones & Stokes)

04 SF K12.2/KP14.3
04 Ala KP0.0/KP2.1
EA 012000

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February 14, 2001

Ms. Nova Blajez:
Environmental Protection Agency
Cross Media Division
75 Hawthorne St., CMD #2
San Francisco CA 94105-3901

Dear Ms. Blazej:

At the request of the Federal Highway Administration (FHWA), Caltrans is pleased to transmit to you a copy of the Administrative Final Environmental Impact Statement (FEIS)/Statutory Exemption for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. Also enclosed are responses to the comments received on the Draft Environmental Impact Statement from your agency and from the Army Corps of Engineers. The volume of all comments and responses and the volume of figures are not included due to time constraints. The Administrative FEIS and responses to comments reflect the Army Corps of Engineers' recent concurrences on the Least Environmentally Damaging Practicable Alternative and conceptual mitigation. We understand that we have not yet received these concurrences from the Environmental Protection Agency (EPA).

Caltrans and FHWA have addressed EPA's comments on the DEIS. EPA's major concerns were:

- The disposal of dredged materials and testing of the sediments for suitability of certain disposal options. This concern was addressed in the Dredged Materials Management Plan, circulated June 1999, in the Sampling and Analysis Report, June 2000, and in the Dredged Material Management Office's response, October 2000. Responses to comments on the Plan will be in the FEIS, with responses to comments on the DEIS.
- Biological resources: Caltrans has prepared and provided to your agency a Conceptual Mitigation Plan for Special Aquatic Sites. Caltrans has also met on several occasions with the Interagency Group that deals with such resources, resulting, we understand, in the satisfaction of EPA's concern. The new and substantially expanded sections on special aquatic sites are found in Chapter 3, Section 3.9, and in Chapter 4, Sections 4.9 and 4.14.
- Air quality: Caltrans has provided additional information on this topic in Chapters 3 and 4 and in responses to comments.
- Cumulative impacts: Chapter 4, Section 4.15, has been rewritten and includes more detailed discussion of cumulative impacts.

As FHWA noted via telephone, we are anticipating that you can provide any comments on the document and letters by February 22, 2001. The very brief time allotted for review is necessary to stay on the expedited schedule set for this project. Hand-written comments on the document itself are acceptable and preferable for ease of any necessary revisions. Please note that this is a document under development, and as such it cannot be released to the public, pursuant to the Freedom of Information Act (FOIA) Exemption 5; see 5 U.S.C. 552(b)(5). Please call Mara Melandry at 510-286-5582 when you have completed your review. We appreciate your prompt attention and continuing assistance with this important seismic safety project.

Sincerely,

HARRY Y. YAHATA
District Director

by:

Marilee Mortenson

for MARA MELANDRY
Environmental Manager, SFOBB

cc:

Calvin Fong	(Army Corps of Engineers)
Rob Lawrence	(army Corps of Engineers)
Deanna Wieman	(Environmental Protection Agency)
Lisa Hanf	(Environmental Protection Agency)
Tim Vendlinkski	(Environmental Protection Agency)
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04 SF K12.2/KP14.3
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February 14, 2001

Captain Robert Lachowsky
Eleventh Coast Guard District
Building 54D
Coast Guard Island
Alameda CA 945501

Dear Captain Lachowsky:

At the request of the Federal Highway Administration (FHWA), and in acknowledgment of the United States Coast Guard's role as a Cooperating Agency for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, Caltrans is pleased to transmit to you a copy of the Administrative Final Environmental Impact Statement (FEIS)/Statutory Exemption. Also enclosed are responses to your agency's comments on the Draft Environmental Impact Statement. The volume of all comments and responses and the volume of figures are not included due to time constraints. The FEIS reflects the Army Corps of Engineers' recent concurrences on the Least Environmentally Damaging Practicable Alternative and conceptual mitigation; we have not yet received EPA's concurrences.

As FHWA noted via telephone, we are anticipating that you can provide any comments on the document and letters by February 22, 2001. The very brief time allotted for review is necessary to stay on the expedited schedule set for this project. Hand-written comments on the document itself are acceptable and preferable for ease of any necessary revisions. Please note that this is a document under development, and as such it cannot be released to the public, pursuant to the Freedom of Information Act (FOIA) Exemption 5; see 5 U.S.C. 552(b)(5). Please call Mara Melandry at 510-286-5582 when you have completed your review. We appreciate your prompt attention and continuing assistance with this important seismic safety project.

Sincerely,

HARRY Y. YAHATA
District Director

by:

Marilee Mortenson

for MARA MELANDRY
Environmental Manager, SFOBB

bc:

Denis J. Mulligan	(Toll Bridge Program)
Steve Hulsebus	(Toll Bridge Program)
Tony Anziano	(D-4 Legal)
Mara Melandry	(Toll Bridge Program)
Cindy Adams	(HQ Environmental Division; Mail Station 27)
Sara Purcell	(FHWA-Western Regional Center)
Bill Wong	(FHWA-California Division)
Ivy Edmonds-Hess	(Parsons-Brinckerhoff)
Mike Davis	(Jones & Stokes)

04 SF K12.2/KP14.3
04 Ala KP0.0/KP2.1
EA 012000

DEPARTMENT OF TRANSPORTATION
DISTRICT 4 - TOLL BRIDGE PROGRAM
111 Grand Avenue
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-4444
TDD (510) 286-4454

February 27, 2001

Mr. John Hill
BRAC Office, Code 06CA.JH
Naval Facilities Engineering Command
1230 Columbia Street, Suite 1100
San Diego, California 92101

Dear Mr. Hill:

At the request of the Federal Highway Administration (FHWA), Caltrans is pleased to transmit to you a copy of the draft responses to the fifty-five comments submitted by the Navy on the Draft Environmental Impact Statement for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. In an effort to fully respond to Navy's concerns, we appreciate any remarks you choose to provide. As you are aware, we are trying to publish the Final Environmental Impact Statement as soon as possible. If we receive your remarks by March 9, 2001, we will be able to address them and incorporate revisions into the document.

Please note that the responses are part of a document under development, and as such they cannot be released to the public, pursuant to the Freedom of Information Act (FOIA) Exemption 5; see 5 U.S.C. 552(b)(5).

We are faxing and mailing the draft responses to you. If you wish to provide your remarks by fax, you can fax them to Mara Melandry at (510) 286-6374. Please call Mara Melandry at 510-286-5582 if you have any questions. We appreciate your continuing assistance with this important seismic safety project.

Sincerely,

HARRY Y. YAHATA
District Director

by:

Mara Melandry

MARA MELANDRY
Environmental Manager, SFOBB

cc: Ron Plaseied (USN-San Diego)
Bill Wong (FHWA-California Division)
Sara Purcell (FHWA-Western Regional Center)

bc:

Denis J. Mulligan	(Toll Bridge Program)
Paul Hensley	(Toll Bridge Program)
Steve Hulsebus	(Toll Bridge Program)
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EA 012000

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213
TEL (310) 980-4000; FAX (310) 980-4018

In reply please refer to:
March 22, 2001 151422SWR00SR189: ME

Harry Yahata, District Director
California Department of Transportation
P.O. Box 23660
Oakland, California, 94623-0660

Dear Mr Yahata:

Thank you for your letter of March 21, 2001, regarding the presence of Federally listed (or proposed for listing) threatened or endangered species or critical habitat that may be affected by the Federal Highway Administration's (FHWA) proposed demonstration pile installation and bridge retrofit project at the San Francisco-Oakland Bay Bridge, in Alameda County, California (FHWA file number: HDA-CA, file #04-SF-80-12.2/14.3).

Available information indicates that the following species may occur in the project area:

Sacramento River winter-run chinook salmon (Oncorhynchus tshawytscha)- endangered
Central Valley ESU spring-run chinook salmon - (Oncorhynchus tshawytscha)- proposed-as-endangered
Central Valley ESU fall\late fall-run chinook salmon - (Oncorhynchus tshawytscha)- proposed-as-threatened
Central California Coast ESU steelhead (Oncorhynchus mykiss) - threatened
Central Valley ESU steelhead (Oncorhynchus mykiss) - threatened
Southern Oregon/Northern California ESU coho salmon (Oncorhynchus kisutch) - threatened
Central California Coast ESU coho salmon (Oncorhynchus kisutch) - threatened

The site is also located within the designated critical habitat for winter-run chinook salmon (58 FR 33212); for spring-run chinook salmon (65 FR 7764); for coho salmon (64 FR 24049); and for steelhead (65 FR 7764)

The project location is also designated as Essential Fish Habitat (EFH) for fish species managed with the following Fishery Management Plan (FMP) under the Magnuson-Stevens Fishery

Conservation and Management Acts:

Pacific Groundfish Fishery Management Plan
Coastal Pelagics Fishery Management Plan
Pacific Coast Salmon Fishery Management Plan

Any biological assessment prepared should also include an EFH Assessment for the species managed by the above FMPs. Complete species lists and information on EFH and the Fishery Management Plans is located on our web site under the Habitat Conservation Division (http://swr.ucsd.edu).

The U.S. Fish and Wildlife Service (USFWS) may also have listed species or critical habitat under its jurisdiction in the project area. Please contact Mr. Joel Medlin, Deputy Field Supervisor, USFWS, at 2800 Cottage Way, W-2605, Sacramento, California 95825, or (916) 414-6600, regarding the presence of listed species or critical habitat under USFWS jurisdiction that may be affected by your project.

Consultation pursuant to section 7 of the Endangered Species Act on the bridge retrofit project was completed between NMFS the Federal Highway Administration on September 23, 1999. Additional consultation on the demonstration pile installation was completed on September 25, 2000.

Please notify Maura Eagan of my staff at (707) 575-6092 regarding any question concerning this consultation.

Sincerely,

Rebecca Lent, Ph.D. For
Regional Administrator

cc: Joan Boliman, FHWA
J. Lecky, NMFS
Mara Melandry, CalTrans

COVER SHEET FAX

To: Mara Melandry
Caltrans

Fax #: (510) 286-6334

Subject: Official updated species list
Retrofit East Span of SF-Oakland Bay Bridge

Date: March 26, 2001

Pages: 13 - including this cover sheet.

COMMENTS:

Mara,

Here is your updated species list for the retrofit of the east span of the San Francisco-Oakland Bay Bridge. As we discussed on the phone, the list is for the Oakland West, rather than East, quad.

Harry Mossman
Biological Technician

Please Deliver ASAP

U.S. FISH & WILDLIFE SERVICE

Phone: (916) 414-6674
Fax: (916) 414-6710
Email: harry_mossman@fws.gov

Harry Mossman
Biological Technician
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W2605
Sacramento, California 95825

Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)

San Francisco lacewing, *Nothochrysa californica* (SC)

Plants

alkali milk-vetch, *Astragalus tener var. tener* (SC) *

San Francisco Bay spineflower, *Chorizanthe cuspidata var. cuspidata* (SC) *

northcoast bird's-beak, *Cordylanthus maritimus ssp. palustris* (SC) *

Kellogg's (wedge-leaved) horkelia, *Horkelia cuneata ssp. sericea* (SC) *

adobe sanicle, *Sanicula maritima* (SC) *

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(MB)	*Migratory Bird*	Migratory bird
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
(*)	*Extirpated*	Possibly extirpated from this quad.
(**)	*Extinct*	Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

Berkeley kangaroo rat, *Dipodomys heermanni berkeleyensis* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

Alameda Island mole, *Scapanus latimanus parvus* (SC)

salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

black rail, *Laterallus jamaicensis coturniculus* (CA)

Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

Fish

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Bridges' Coast Range shoulderband snail, *Helminthoglypta nickliniana bridgesi* (SC)

ENCLOSURE A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Selected Quads Listed Below
Reference File No. 1-1-97-SP-2027 UPDATE
Retrofit of West Span of SF-Oakland Bay Bridge
March 26, 2001

QUAD : 466D OAKLAND WEST

Listed Species

Mammals

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

California least tern, *Sterna antillarum (=albifrons) browni* (E)

Reptiles

Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

tidewater goby, *Eucyclogobius newberryi* (E)

delta smelt, *Hypomesus transpacificus* (T)

coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Central California Coastal steelhead, *Oncorhynchus mykiss* (T)

Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Plants

Santa Cruz tarplant, *Holocarpha macradenia* (T)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Endangered and Threatened Species that May Occur in or be Affected by
Projects in the Area of the Following California Counties
March 26, 2001

ALAMEDA COUNTY

Listed Species

Mammals

- salt marsh harvest mouse, *Reithrodontomys raviventris* (E)
- San Joaquin kit fox, *Vulpes macrotis mutica* (E)
- riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *
- riparian brush rabbit, *Sylvilagus bachmani riparius* (E) *

Birds

- California brown pelican, *Pelecanus occidentalis californicus* (E)
- California clapper rail, *Rallus longirostris obsoletus* (E)
- California least tern, *Sterna antillarum (=albifrons) browni* (E)
- bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

- Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)
- Critical habitat, Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)
- giant garter snake, *Thamnophis gigas* (T)

Amphibians

- California red-legged frog, *Rana aurora draytonli* (T)

Fish

- tidewater goby, *Eucyclogobius newberryi* (E)
- Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)
- winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)
- delta smelt, *Hypomesus transpacificus* (T)
- Central California Coastal steelhead, *Oncorhynchus mykiss* (T)
- Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)
- Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)
- Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

- longhorn fairy shrimp, *Branchinecta longiantenna* (E)
- vernal pool tadpole shrimp, *Lepidurus packardi* (E)
- callippe silverspot butterfly, *Speyeria callippe callippe* (E)
- vernal pool fairy shrimp, *Branchinecta lynchi* (T)
- bay checkerspot butterfly, *Euphydryas editha bayensis* (T)

Plants

large-flowered fiddleneck, *Amsinckia grandiflora* (E)

Presidio clarkia, *Clarkia franciscana* (E)

palmate-bracted bird's-beak, *Cordylanthus palmatus* (E)

pallid manzanita (Alameda manzanita), *Arctostaphylos pallida* (T)

robust spineflower, *Chorizanthe robusta* (E) *

Contra Costa goldfields, *Lasthenia conjugens* (E) *

California sea blite, *Suaeda californica* (E) *

showy Indian clover, *Trifolium amoenum* (E) *

Santa Cruz tarplant, *Holocarpha macradenia* (T) *

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Alameda Island mole, *Scapanus latimanus parvus* (SC)

salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)

Berkeley kangaroo rat, *Dipodomys heermanni berkeleyensis* (SC) *

Birds

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

black rail, *Laterallus jamaicensis coturniculus* (CA)

bank swallow, *Riparia riparia* (CA)

Aleutian Canada goose, *Branta canadensis leucopareia* (D)
American peregrine falcon, *Falco peregrinus anatum* (D)
Black-Crowned Night Heron, *Nycticorax nycticorax* (MB)
tricolored blackbird, *Agelaius tricolor* (SC)
grasshopper sparrow, *Ammodramus savannarum* (SC)
Bell's sage sparrow, *Amphispiza belli belli* (SC)
short-eared owl, *Asio flammeus* (SC)
western burrowing owl, *Athene cunicularia hypugea* (SC)
American bittern, *Botaurus lentiginosus* (SC)
ferruginous hawk, *Buteo regalis* (SC)
Costa's hummingbird, *Calypte costae* (SC)
Lawrence's goldfinch, *Carduelis lawrencei* (SC)
Vaux's swift, *Chaetura vauxi* (SC)
lark sparrow, *Chondestes grammacus* (SC)
olive-sided flycatcher, *Contopus cooperi* (SC)
hermit warbler, *Dendroica occidentalis* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
Pacific-slope flycatcher, *Empidonax difficilis* (SC)
common loon, *Gavia immer* (SC)
saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)
loggerhead shrike, *Lanius ludovicianus* (SC)
Lewis' woodpecker, *Melanerpes lewis* (SC)
Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)
long-billed curlew, *Numenius americanus* (SC)
white-faced ibis, *Plegadis chihi* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
Allen's hummingbird, *Selasphorus sasin* (SC)
red-breasted sapsucker, *Sphyrapicus ruber* (SC)
Bewick's wren, *Thryomanes bewickii* (SC)
California thrasher, *Toxostoma redivivum* (SC)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)
northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)
San Joaquin coachwhip (=whipsnake), *Masticophis flagellum ruddocki* (SC)
California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

- foothill yellow-legged frog, *Rana boylii* (SC)
- western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

- green sturgeon, *Acipenser medirostris* (SC)
- river lamprey, *Lampetra ayresi* (SC)
- Pacific lamprey, *Lampetra tridentata* (SC)
- longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

- Opler's longhorn moth, *Adela oplerella* (SC)
- Bridges' Coast Range shoulderband snail, *Helminthoglypta nickliniana bridgesi* (SC)
- Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)
- curved-foot hygrotus diving beetle, *Hygrotus curvipes* (SC)
- California linderiella fairy shrimp, *Linderiella occidentalis* (SC)
- San Francisco lacewing, *Nothochrysa californica* (SC)

Plants

- heartscale, *Atriplex cordulata* (SC)
- brittlescale, *Atriplex depressa* (SC)
- valley spearscale, *Atriplex joaquiniana* (SC)
- Mt. Hamilton thistle, *Cirsium fontinale var. campylon* (SC)
- South Bay clarkia, *Clarkia concinna ssp. automixa* (SC)
- hispid bird's-beak, *Cordylanthus mollis ssp. hispidus* (SC)
- Livermore tarplant, *Deinandra bacigalupii* (SC)
- interior California larkspur, *Delphinium californicum ssp. interius* (SC)
- recurved larkspur, *Delphinium recurvatum* (SC)
- diamond-petaled poppy, *Eschscholzia rhombipetala* (SC)
- talus fritillary, *Fritillaria falcata* (SC)
- fragrant fritillary, *Fritillaria liliacea* (SC)
- Diablo helianthella (=rock-rose), *Helianthella castanea* (SC)
- pappose spikeweed, *Hemizonia perryi ssp. congdonii* (SC)
- delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
- Mason's lilaeopsis, *Lilaeopsis masonii* (SC)
- little mousetail, *Myosurus minimus ssp. apus* (SC)
- most beautiful (uncommon) jewelflower, *Streptanthus albidus ssp. peramoenus* (SC)
- alkali milk-vetch, *Astragalus tener var. tener* (SC) *
- San Francisco Bay spineflower, *Chorizanthe cuspidata var. cuspidata* (SC) *
- northcoast bird's-beak, *Cordylanthus maritimus ssp. palustris* (SC) *

Kellogg's (wedge-leaved) horkelia, *Horkelia cuneata ssp. sericea* (SC) *

adobe sanicle, *Sanicula maritima* (SC) *

caper-fruited tropidocarpum, *Tropidocarpum capparideum* (SC) **

Mt. Diablo phacelia, *Phacelia phacelicides* (SC)

SAN FRANCISCO COUNTY

Listed Species

Mammals

sei whale, *Balaenoptera borealis* (E)

blue whale, *Balaenoptera musculus* (E)

finback (=fin) whale, *Balaenoptera physalus* (E)

right whale, *Eubalaena glacialis* (E)

humpback whale, *Megaptera novaeangliae* (E)

sperm whale, *Physeter catodon (=macrocephalus)* (E)

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Guadalupe fur seal, *Arctocephalus townsendi* (T)

Critical Habitat, Steller (=northern) sea-lion, *Eumetopias jubatus* (T)

Steller (=northern) sea-lion, *Eumetopias jubatus* (T)

Birds

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

leatherback turtle, *Dermochelys coriacea* (E)

loggerhead turtle, *Caretta caretta* (T)

green turtle, *Chelonia mydas (incl. agassizi)* (T)

olive (=Pacific) ridley sea turtle, *Lepidochelys olivacea* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

tidewater goby, *Eucyclogobius newberryi* (E)

Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

delta smelt, *Hypomesus transpacificus* (T)

Central California Coastal steelhead, *Oncorhynchus mykiss* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

mission blue butterfly, *Icaricia icarioides missionensis* (E)

San Bruno elfin butterfly, *Incisalia mossii bayensis* (E)

Plants

Presidio manzanita, *Arctostaphylos hookeri ssp. ravenii* (E)

Presidio clarkia, *Clarkia franciscana* (E)

San Francisco lessingia, *Lessingia germanorum* (E)

Marin dwarf-flax, *Hesperolinon congestum* (T)

marsh sandwort, *Arenaria paludicola* (E) *

beach layia, *Layia carnosa* (E) *

Proposed Species

Birds

short-tailed albatross, *Diomedea albatrus* (PE)

Invertebrates

white abalone, *Haliotes sorenseni* (PE)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Invertebrates

black abalone, *Haliotes cracherodii* (C)

Species of Concern

Mammals

gray whale, *Eschrichtius robustus* (D)

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)

Birds

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

black rail, *Laterallus jamaicensis coturniculus* (CA)

bank swallow, *Riparia riparia* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

Black-Crowned Night Heron, *Nycticorax nycticorax* (MB)
tricolored blackbird, *Agelaius tricolor* (SC)
grasshopper sparrow, *Ammodramus savannarum* (SC)
Bell's sage sparrow, *Amphispiza belli belli* (SC)
American bittern, *Botaurus lentiginosus* (SC)
ferruginous hawk, *Buteo regalis* (SC)
Vaux's swift, *Chaetura vauxi* (SC)
lark sparrow, *Chondestes grammacus* (SC)
olive-sided flycatcher, *Contopus cooperi* (SC)
hermit warbler, *Dendroica occidentalis* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
Pacific-slope flycatcher, *Empidonax difficilis* (SC)
common loon, *Gavia immer* (SC)
saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)
loggerhead shrike, *Lanius ludovicianus* (SC)
Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)
long-billed curlew, *Numenius americanus* (SC)
ashy storm-petrel, *Oceanodroma homochroa* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
Allen's hummingbird, *Selasphorus sasin* (SC)
red-breasted sapsucker, *Sphyrapicus ruber* (SC)
elegant tern, *Sterna elegans* (SC)
Xantus' murrelet, *Synthliboramphus hypoleucus* (SC)
Bewick's wren, *Thryomanes bewickii* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)
California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)
river lamprey, *Lampetra ayresi* (SC)
Pacific lamprey, *Lampetra tridentata* (SC)
longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Opler's longhorn moth, *Adela oplerella* (SC)

sandy beach tiger beetle, *Cicindela hirticollis gravida* (SC)

globose dune beetle, *Coelus globosus* (SC)

Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)

bumblebee scarab beetle, *Lichnanthe ursina* (SC)

Plants

San Francisco Bay spineflower, *Chorizanthe cuspidata var. cuspidata* (SC)

San Francisco wallflower, *Erysimum franciscanum* (SC)

fragrant fritillary, *Fritillaria liliacea* (SC)

San Francisco gumplant, *Grindelia hirsutula var. maritima* (SC)

Marin checkermallow, *Sidalcea hickmanii ssp. viridis* (SC)

Mission Delores campion, *Silene verecunda ssp. verecunda* (SC)

San Francisco owl's-clover, *Triphysaria floribunda* (SC)

San Francisco popcornflower, *Plagiobothrys diffusus* (CA) *

alkali milk-vetch, *Astragalus tener var. tener* (SC) *

compact cobweb thistle, *Cirsium occidentale var. compactum* (SC) *

Diablo helianthella (=rock-rose), *Helianthella castanea* (SC) *

Kellogg's (wedge-leaved) horkelia, *Horkelia cuneata ssp. sericea* (SC) *

adobe sanicle, *Sanicula maritima* (SC) *

San Francisco manzanita, *Arctostaphylos hookeri ssp. franciscana* (SC) **

coast lily, *Lilium maritimum* (SC) ?*

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	Other species of concern to the Service.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
*	*Extirpated*	Possibly extirpated from the area.
**	*Extinct*	Possibly extinct
	Critical Habitat	Area essential to the conservation of a species.

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by counties and by U.S. Geological Survey 7½ minute *quads*. The United States is divided into these quads, which are about the size of San Francisco. If you requested your list by county or by quad name or number, that is what we used. Otherwise, we used the information you sent us to determine which counties and quads to use.

Animals

The animals on your species list are ones that occur within, *or may be affected by projects within*, the quads covered by the list. Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them. Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents. Birds are shown regardless of whether they are resident or migratory. Relevant birds on a county list should be considered regardless of whether they appear on a quad list for that county.

Plants

Any plants on your list are ones *that have actually been observed* in the quad or quads covered by the list. We may have also given you either a county species list or a list of species in nearby quads. We recommend that you check for the plants on this additional list.

State-Listed Species

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. *However you should contact the California Department of Fish and Game for official information about these species.* Call (916) 322-2493 or write Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as *critical habitat*. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, this will be noted on the species list. Maps and boundary descriptions of the critical habitat may be found in the *Federal Register*. The information is also reprinted in the *Code of Federal Regulations* (50 **CFR** 17.95).

Species of Concern

Your list may contain a section called *Species of Concern*. This term includes former *category 2 candidate species* and other plants and animals of concern to the Service and other Federal, State and private conservation agencies and organizations. Some of these species may become candidate species in the future.

APPENDIX H
NOTICE OF EXEMPTION

NOTICE OF EXEMPTION

To: ☑ Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

☐ County Clerk
County of

From: State of California
Department of Transportation
Environmental Planning, South
P.O. Box 23660
Oakland, CA 94623-0660

Project Title: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project

Project Location - Specific: Interstate 80 between Yerba Buena Island and the Oakland shore

Project Location - City: San Francisco and Oakland

Project Location - County: San Francisco and Alameda

Description of Nature, Purpose, and Beneficiaries of Project: The project proposes to seismically retrofit or replace the existing East Span to provide a "lifeline" connection (providing post earthquake relief access) between San Francisco and the East Bay. After implementation of the project, it is expected that the East Span would be able to withstand a maximum credible earthquake on the San Andreas or Hayward faults. It would also bring the East Span up to current roadway design standards for operations and safety to the greatest extent possible. The direct beneficiaries would be users of the East Span. Communities in San Francisco, the San Francisco Peninsula, and the East Bay would benefit after an earthquake due to the East Span project in combination with other seismic safety projects undertaken by Caltrans.

Name of Public Agency Approving Project: California Department of Transportation and the Federal Highway Administration

Name of Person or Agency Carrying Out Project: California Department of Transportation

Exempt Status: *(check one)*

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☑ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));

Reasons why project is exempt: The San Francisco-Oakland East Span Seismic Safety Project is statutorily exempt from the requirements of the California Environmental Quality Act (CEQA) under California Streets and Highways Code Section 180.2 and CEQA Section 21080.

CEQA Section 21080, subdivision (b) sets forth the types of activities that are excluded from CEQA, and paragraph (4) of this subdivision specifically includes actions necessary to prevent or mitigate an emergency. According to the California Streets and Highway Code, as amended, the structural modification of an existing highway structure or toll bridge (Section 180.2 (a)); and the replacement of a highway structure or toll bridge within, or immediately adjacent to an existing right-of-way (Section 180.2 (b)) shall be considered to be activities under subdivision (b), paragraph (4).

Lead Agency Contact Person: Tony Anziano
Area Code/Telephone/Extension: 415/982-3130

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project?
   ☑ Yes ☐ No

Signature: Harry G. Yahata Date: 9/18/98 Title: DISTRICT DIRECTOR

Date received for filing at OPR:

APPENDIX I
RELOCATION ASSISTANCE INFORMATION

APPENDIX I
RELOCATION ASSISTANCE INFORMATION

I IMPORTANT RELOCATION ASSISTANCE INFORMATION

The following explanation is general in nature and is not intended to be a complete statement of Federal and State relocation laws and regulations. Any questions concerning relocation should be addressed to Caltrans Right-of-Way.

Any persons to be displaced will be assigned to a relocation advisor, who will work closely with each displacee in order to see that all payments and benefits are fully utilized and that all regulations are observed, thereby avoiding the possibility of displacees jeopardizing or forfeiting any of their benefits or payments. At the time of the first written offer to purchase, owner-occupants are given a detailed explanation of the State's relocation services. Tenant occupants of properties to be acquired are contacted soon after the first written offer to purchase and also are given a detailed explanation of the Caltrans Relocation Program. To avoid loss of possible benefits, no individual, family, business, farm, or nonprofit organization should commit to purchase or rent a replacement property without first contacting a Caltrans relocation advisor.

II RELOCATION ASSISTANCE ADVISORY SERVICES

In accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, Caltrans will provide relocation advisory assistance to any person, business, farm, or nonprofit organization displaced as a result of the acquisition of real property for public use. Caltrans will assist displacees in obtaining comparable replacement housing by providing current and continuing information on the availability and prices of both houses for sale and rental units that are "decent, safe, and sanitary". Nonresidential displacees will receive information on comparable properties for lease or purchase. (For business, farm, and nonprofit organization relocation services, see Section IV.)

Residential replacement dwellings will be in equal or better neighborhoods at rents or prices within the financial ability of the individuals and families displaced and reasonably accessible to their places of employment. Before any displacement occurs, comparable replacement dwellings will be offered to displacees that are open to all persons regardless of race, color, religion, sex, national origin, and consistent with the requirements of Title VIII of the Civil Rights Act of 1968. This assistance will also include the supplying of information concerning Federal- and State-assisted housing programs and any other known services being offered by public and private agencies in the area.

Persons who are eligible for relocation payments and who are legally occupying the property required for the project will not be asked to move without first being given at least 90 days' written notice. Occupants eligible for relocation payment(s) will not be

required to move unless at least one comparable "decent, safe, and sanitary" replacement residence, available on the market, is offered to them by Caltrans.

III RESIDENTIAL RELOCATION PAYMENTS PROGRAM

The Relocation Payment Program will help eligible residential occupants by paying certain costs and expenses. These costs are limited to those necessary for or incidental to the purchase or rental of the replacement dwelling and actual reasonable moving expenses to a new location within 50 miles of the displacement property. Any actual moving costs in excess of the 50 miles are the responsibility of the displacee. The Residential Relocation Program can be summarized as follows:

Moving Costs

Any displaced person who lawfully occupied the acquired property, regardless of the length of occupancy in the property acquired, will be eligible for reimbursement of moving costs. Displacees will receive either the actual reasonable costs involved in moving themselves and personal property up to a maximum of 50 miles, or a fixed payment based on a fixed moving-cost schedule.

Purchase Supplement

In addition to moving and related expense payments, fully eligible homeowners may be entitled to payments for increased costs of replacement housing.

Homeowners, who have owned and occupied their property for 180 days or more prior to the date of the first written offer to purchase the property, may qualify to receive a price differential payment and may qualify to receive reimbursement for certain non-recurring costs incidental to the purchase of the replacement property. An interest differential payment is also available if the interest rate for the loan on the replacement dwelling is higher than the loan rate on the displacement dwelling, subject to certain limitations on reimbursement based upon the replacement property interest rate. The maximum combination of these three supplemental payments that the owner-occupant can receive is $22,500. If the total entitlement (without the moving payments) is in excess of $22,500, the Last Resort Housing Program will be used. (See the explanation of the Last Resort Housing Program below.)

Rental Supplement

Tenants who have occupied the property to be acquired by Caltrans for 90 days or more and owner-occupants of 90-179 days prior to the date of the first written offer to purchase may qualify to receive a rental differential payment. This payment is made when Caltrans determines that the cost to rent a comparable "decent, safe, and sanitary" replacement dwelling will be more than the present rent of the displacement dwelling. As an alternative, the tenant may qualify for a down payment benefit designed to assist in the purchase of a replacement property and the payment of certain costs incidental to the purchase, subject to certain limitations noted below under the Down Payment section. The maximum amount payable to any tenant of 90 days or more and any owner-occupant of 90-179 days, in addition to moving expenses, is $5,250. If the total entitlement for rental supplement exceeds $5,250, the Last Resort Housing Program will be used.

In addition to the occupancy requirements in order to receive any relocation benefits, the displaced person must buy or rent and occupy a "decent, safe, and sanitary" replacement dwelling within one year from the date the department takes legal possession of the property, or from the date the displacee vacates the displacement property, whichever is later.

Down Payment

The down payment option has been designed to aid owner-occupants of 90-179 days and tenants with no less than 90 days of continuous occupancy prior to Caltrans first written offer. The down payment and incidental expenses cannot exceed the maximum payment of $5,250. The one-year eligibility period in which to purchase and occupy a "decent, safe, and sanitary" replacement dwelling will apply.

Last Resort Housing

Federal regulations (49 CFR 24) contain the policy and procedure for implementing the Last Resort Housing Program on Federal-aid projects. Last Resort Housing benefits are, except for the amounts of payments and the methods in making them, the same as those benefits for standard residential relocation as explained above. Last Resort Housing has been designed primarily to cover situations where a displacee cannot be relocated because of lack of available comparable replacement housing, or when the anticipated replacement housing payments exceed the $5,250 and $22,500 limits of the standard relocation procedure, because either the displacee lacks the financial ability or other valid circumstances. In certain exceptional situations, Last Resort Housing may also be used for tenants of less than 90 days.

After the first written offer to acquire the property has been made, Caltrans will, within a reasonable length of time, personally contact the displacees to gather important information, including the following:

- Preferences in area of relocation;
- Number of people to be displaced and the distribution of adults and children according to age and sex;
- Location of school and employment;
- Specific arrangements needed to accommodate any family member(s) special needs; and
- Financial ability to relocate into comparable replacement dwelling that will adequately house all members of the family.

IV THE NONRESIDENTIAL RELOCATION ASSISTANCE PROGRAM

The Nonresidential Relocation Assistance Program provides assistance to businesses, farms, and nonprofit organizations in locating suitable replacement property and reimbursement for certain costs involved in relocation. The Relocation Advisory Assistance Program will provide current lists of properties offered for sale or rent suitable for the specific relocation needs of a particular business. The types of payments available to eligible businesses, farms, and nonprofit organizations are moving and searching expenses and, possibly, re-establishment expenses or a fixed in lieu payment instead of any moving, searching, and re-establishment expenses. The payment types can be summarized as follows:

Moving Expenses

Moving expenses may include the following actual reasonable costs:

- The moving of inventory, machinery, equipment, and similar business-related property dismantling, disconnecting, crating, packing, loading, insuring, transporting, unloading, unpacking, and reconnecting of personal property;
- Loss of tangible personal property provides payment for actual, direct loss of personal property that the owner is permitted not to move; and
- Expenses related to searching for a new business site, up to $1,000 for reasonable expenses actually incurred.

Re-establishment Expenses

Re-establishment expenses related to the operation of the business at the new location, up to $10,000 for reasonable expenses actually incurred.

Fixed In Lieu Payment

A fixed payment in lieu of moving and searching payments and re-establishment payment may be available to businesses which meet certain eligibility requirements. This payment is an amount equal to the average annual net earnings for the last two taxable years prior to the relocation and may not be less than $1,000 nor more than $20,000.

V ADDITIONAL INFORMATION

Relocation Payments Not Income

Reimbursement for moving costs and replacement housing payments are not considered income for the purpose of the Internal Revenue Code of 1954, or resources for the purpose of determining the extent of eligibility of a displacee for assistance under the Social Security Act, local "Section 8" Housing programs, or other Federal assistance programs.

Right to Appeal

Any person, business, farm, or nonprofit organization which has been refused a relocation payment by the Caltrans relocation advisor or believes that the payment(s) offered by the agency are inadequate, may appeal for a special hearing of their complaint. No legal assistance is required. Information about the appeal procedure is available from the relocation advisor.

APPENDIX J
BIBLIOGRAPHY

APPENDIX J
BIBLIOGRAPHY

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APPENDIX K
SEISMIC DESIGN

APPENDIX K
SEISMIC DESIGN

Earthquakes are commonly reported in terms of their magnitude. The larger the magnitude, the bigger the earthquake, and the greater the potential for damage. When engineers design structures to resist earthquakes, they use "rock motions" — the vibrations that travel through the bedrock caused by the slipping of an earthquake fault. Seismologists develop the rock motions based on the structure's location in relation to the location of earthquake faults and historical and geotechnical project site data. Engineers use these rock motions to calculate the maximum seismic forces that the structure will experience and then design the structure to resist the forces.

Rock motions propagate up through the soil layers to the ground surface, where they become "ground motions" — rock motions cause ground motions. Ground motions are not the same as rock motions. Ground motions caused by the same rock motions will vary due to the soil conditions. The rock motions can be uniform along a project site, but for a long bridge like the Bay Bridge, the ground motions change along the length of the bridge as the soil changes.

For example, during the Loma Prieta earthquake, the ground motions varied at different locations, and this was reflected in the differing amounts of damage. Rock motions were amplified by the soft Bay Muds, and the resulting ground motions caused substantial damage in particular areas (such as the I-880/Cypress Freeway and San Francisco's Marina District). Where the soil is more stable material, the rock motions were not amplified as much, the ground motions were not as great, and there was little damage. Seismologists and geotechnical engineers use the rock motions and then translate them (by computer) into ground motions. However, rock motions are the basis of engineering calculations.

Design Rock Motions

Bridge design in earthquake-prone areas needs to take into account the anticipated rock motions at the bridge site. The challenge for designers is that the rock motion frequencies of future earthquakes cannot be predicted. The design rock motion is the model of anticipated rock motion that is developed for design purposes. It assumes that rock motions are strong over a broad range of frequencies, although this would never happen in a real earthquake. By assuming that rock motions are strong over a broad range of frequencies, this model takes into account the actual earthquakes that would generate strong motions for one or more of these frequencies.

Design Rock Motions for San Francisco-Oakland Bay Bridge East Span Replacement Structures

Replacement structures for the San Francisco-Oakland Bay Bridge East Span will be designed for rare seismic events. The Hayward and San Andreas faults are the dominant sources for rock motions for this bridge site, though other sources in the area have been considered in development of the bridge design.

There are two methods of estimating the greatest rock motion that a particular structure will experience. In the past, Caltrans considered the motions from the Maximum Credible Event (MCE). The MCE is the largest reasonable earthquake at a fault without regard or consideration of how often the earthquake might occur (the return period). It also does not provide a consistent or rational assessment of the probability that a structure will experience the design earthquake. For the East Span Project, Caltrans estimated the greatest rock motions from the Safety Evaluation Event (SEE). This is defined as an earthquake that generates the largest motions expected to occur at the bridge site once every 1,500 years (a 1500-year return period). The bridge's expected life span is 150 years, so there is approximately a 10% chance that this earthquake would happen during its life span. Caltrans was aided in the development of the ground motions by the Ad Hoc Committee on Seismic Ground Motions. This ad hoc committee is comprised of four members:

- The Chairperson is Professor Bruce Bolt, Professor Emeritus of Seismology at the University of California at Berkeley;
- Dr. Norman Abrahamson, a world-renowned geoscientist with expertise in assessing seismic ground motions;
- Dr. Richard Borcherdt, a seismologist from the U.S. Geological Survey with a specialization in recording earthquake ground motions; and
- Dr. Joseph Penzien, Professor Emeritus from the University of California at Berkeley, who is recognized as a world leader in structural dynamics and probability and statistics.

The Seismic Safety Peer Review Panel and the Metropolitan Transportation Commission's Engineering and Design Advisory Panel both accepted and agreed that the bridge should be designed for these SEE ground motions.

The Ad Hoc Committee on Seismic Ground Motions evaluated the recently issued report by the Army Corps of Engineers (ACOE) on retrofit versus replacement of the East Span. In particular, the committee focused on one of the ACOE's conclusions: "the performance of the replacement bridge during a Maximum Credible Earthquake cannot be determined. The bridge has not been evaluated or designed for a MCE event, which is larger than the SEE event." The Committee pointed out that this conclusion is based on an error in plotting a graph included in the ACOE's report. In fact, the MCE motions fall well below the SEE motions in all relevant data ranges, particularly during the initial shaking. In addition, the Ad Hoc Committee's evaluation of the ACOE's report explained that responses of structures (estimated for earthquakes of various magnitudes and for various source-to-site distances) depend crucially on the measurement of ground motions in actual large earthquakes. As additional recordings become available from such earthquakes, these new ground motion recordings are incorporated into the existing international database. Professor Bolt has stated that the SEE standard takes into account a wider range of possible ground motions, some of which are much higher in impact than MCE's predicted motions. The Ad Hoc Committee concluded that Caltrans studied both standards (MCE and SEE) and designed the bridge to the higher SEE standard.

APPENDIX L

TITLE VI POLICY STATEMENT

DEPARTMENT OF TRANSPORTATION
OFFICE OF THE DIRECTOR
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P. O. BOX 942873
SACRAMENTO, CA 94273-0001
PHONE (916) 654-5267
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July 26, 2000

TITLE VI
POLICY STATEMENT

The California State Department of Transportation under Title VI of the Civil Rights Act of 1964 and related statutes, ensures that no person in the State of California shall, on the grounds of race, color, sex and national origin be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity it administers.

Jeff Morales

JEFF MORALES
Director

APPENDIX M
DREDGED MATERIAL MANAGEMENT PLAN (DMMP)

Errata Sheet for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project Dredged Material Management Plan, June 1999

The Dredge Material Management Plan (DMMP) was published by Caltrans in June 1999. This errata sheet lists corrections to the DMMP and updated dredged material quantity calculations.

1. On page 3-1 in section 3.1 paragraph 3 second bullet the text states "Excavate within the shallow areas of the east shoreline of the Bay, i.e., less than 4.3 meters (14 feet) below mean low low water (MLLW)." The corrected text should read "Excavate within the shallow areas of the east shoreline of the Bay, i.e., less than 4.3 meters (14 feet) below mean sea level (MSL) in the NGVD datum."

2. Figure 3-1, Dredged Construction Channel Cross-Section, includes incorrect elevation data. The elevation call-outs, -3.7 meters (-12 feet) MLLW and -4.3 meters (-14 feet) MLLW should read -3.7 meters (-12 feet) MSL and -4.3 meters (-14 feet) MSL. The width of the bottom of the channel is corrected from 192 meters (630 feet) to 115 meters (380 feet). The south edge of the channel should align with the south drip line of the eastbound bridge. The distance between the north drip line of the westbound bridge to the north edge of channel is 50 meters (164 feet), not 116 meters (380 feet). The other dimensions should be deleted.

3. Figure 3-5, Dredged Dismantling Channel Cross-Section, includes incorrect information. The elevation call-outs, -3.7 meters (-12 feet) MLLW and -4.3 meters (-14 feet) MLLW should read -3.7 meters (-12 feet) MSL and -4.3 meters (-14 feet) MSL. The dimension of 82 meters (270 feet) should be 80 meters (262 feet). The dimension of 6 meters (20 feet) should be 10 meters (31 feet). The dimension of 21 meters (70 feet) should be 20 meters (66 feet).

4. Figure 6-1, In-Bay Disposal Permit Procedures, has been revised to indicate that the San Francisco Bay Conservation and Development Commission (BCDC) may issue a permit only after the State Lands Commission and the Regional Water Quality Control Board have made their determination. This edit was requested by BCDC as part of its comment letter on the DMMP.

5. On page 6-11 and Table 6-3, the cost information for cubic meters is incorrect. On page 6-11, paragraph one, the second sentence reads "In general, dredging costs are assumed to be $11.50 per cubic meter ($15.00 per cubic yard) for all the reuse/disposal options except for sidecasting which is estimated at $13.00 per cubic meter ($17.00 per cubic yard) and includes the dredging and "disposal" in one unit cost." The corrected sentence should read "In general, dredging costs are assumed to be $19.62 per cubic meter ($15.00 per cubic yard) for all the reuse/disposal options except for sidecasting which is estimated at $22.24 per cubic meter ($17.00 per cubic yard) and includes the dredging and "disposal" in one unit cost." A corrected Table 6-3 is attached.

6. The activities that require dredging and therefore quantities of dredged materials have changed since publication of the DMMP. Some of the factors that have contributed to the difference in dredge quantities include:

- Refinement of the bathymetry of the bottom of the Bay;
- Redesign of some of the components of the bridge footings; and
- A clearer understanding of in-Bay construction methodology.

7. For the northern alternatives, the barge access channel that would be used by the contractor for construction of the Oakland Touchdown portion has been narrowed to 45 meters (150 feet) beyond the north drip line of the westbound bridge from 50 meters (165 feet). The bottom elevation of that section of the dredged channel was raised from -4.3 meters (-14 feet) MSL to -3.7 meters (-12 feet) MSL. This redesign minimizes impacts of dredging on special aquatic sites.

8. The assumptions that led to upper and lower limits of dredged quantities have changed. Construction scenarios envisioned when the DMMP was prepared in 1999 assumed:

(1) a barge access channel would be dredged along the northern edge of the Oakland Touchdown area or

(2) trestles along the northern edge of the Oakland Touchdown from which structures would be built.

Subsequent to a DMMP, it has been determined that barge access along the northern edge of the Oakland Touchdown area would be required to install the large diameter piles for the westbound structure. Construction scenarios now assume use of an access channel with trestles and falsework placed within the channel after dredging.

The following table compares the dredged material quantities in the DMMP and the current estimate of dredged material quantities. Please see Section 4.14.10 – Construction Excavation and Dredging in Volume I of the Final EIS for a description of dredging required to construct East Span Project build alternatives.

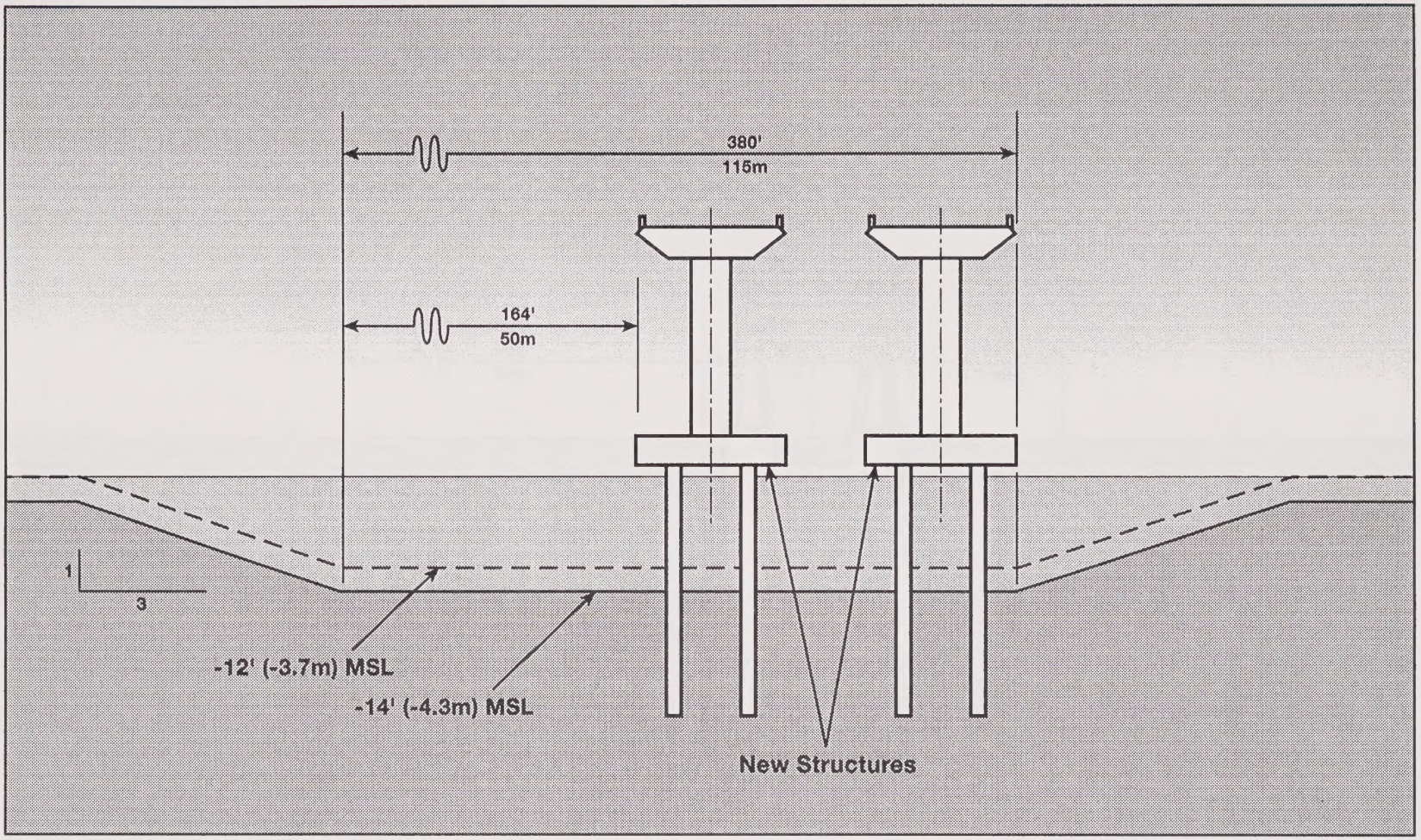
Comparison of Dredged Material Quantities Presented in the DMMP and the Final EIS

	Dredged Material Quantities cubic meters (cubic yards)		
	Replacement Alternative N-6 (Preferred)	**Replacement Alternative N-2**	**Replacement Alternative S-4**
DMMP – upper limit	448,000 (585,000)	448,000 (585,000)	335,000 (438,000)
DMMP – lower limit	262,000 (343,000)	262,000 (343,000)	269,000 (352,000)
Final EIS	413,000 (540,000)	413,000 (540,000)	417,000 (545,000)

Table 6-3
Summary of Reuse/Disposal Estimated Costs

REUSE/DISPOSAL OPTION	COST/m^3 (cost/cy)		
	Dredging	Transport and Disposal	Total
SF-11 (Alcatraz)	$19.62 ($15)	$9.16 ($7)	$28.78 ($22)
SF-DODS (Ocean)	$19.62 ($15)	$15.70 ($12)	$35.31 ($27)
Montezuma Wetlands	$19.62 ($15)	$60.16 ($46)	$79.78 ($61)
Hamilton Wetlands	$19.62 ($15)	$30.08 ($23)	$49.70 ($38)
Upland Landfilles (Class II – average)	$19.62 ($15)	$102.02 ($78)	$121.64 ($93)
Sidecasting	$22.24 ($17)	Included in dredging cost	$22.24 ($17)

Source: Parsons Brinckerhoff and URS Greiner Woodward Clyde, 1999.



View: Looking East, North Side of Replacement Alternative N-6

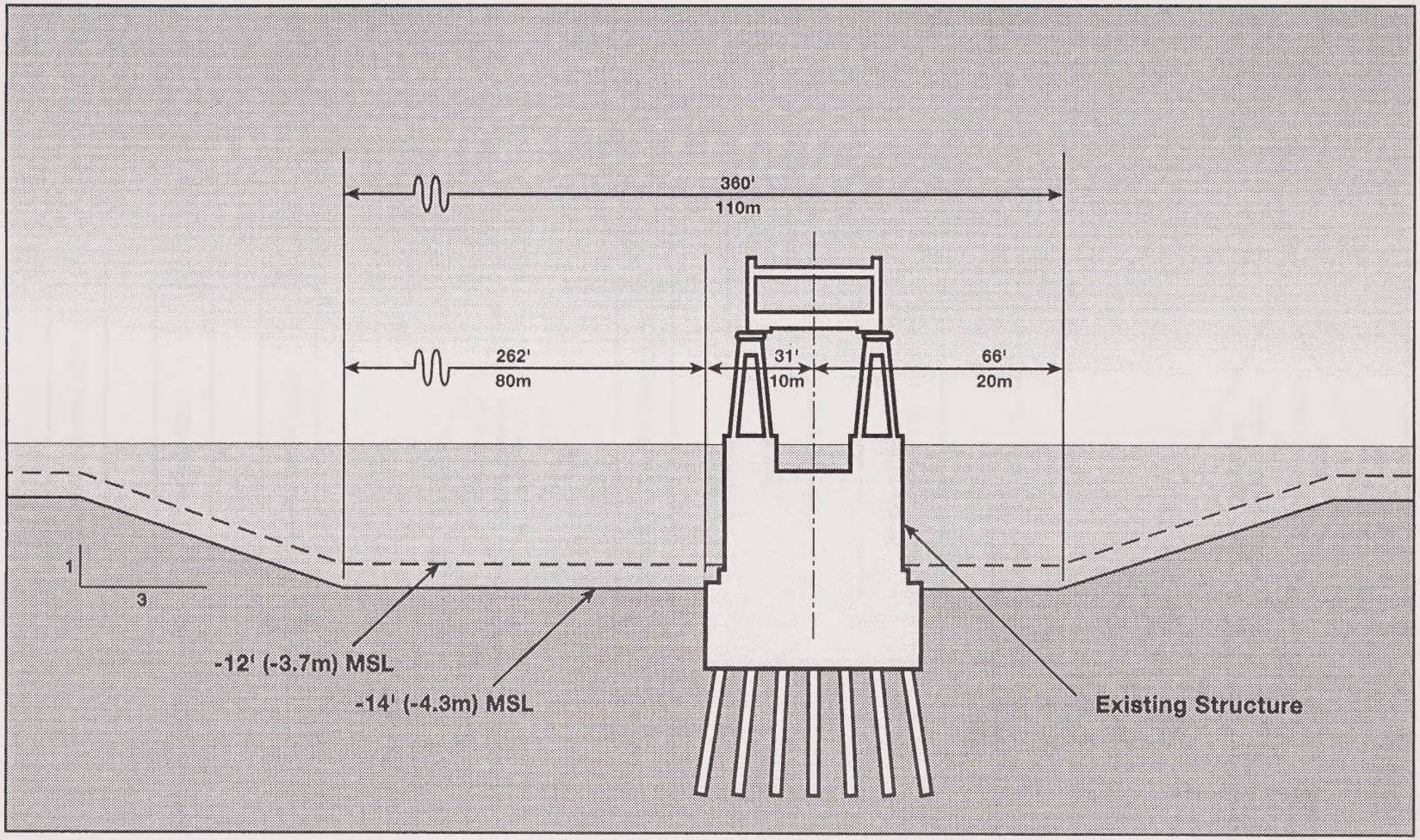
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NOT TO SCALE

Dredged Construction Channel
Cross-Section

Figure 3-1

PDQ&D 11/29/00



View: Looking West, South Side of Existing SFOBB

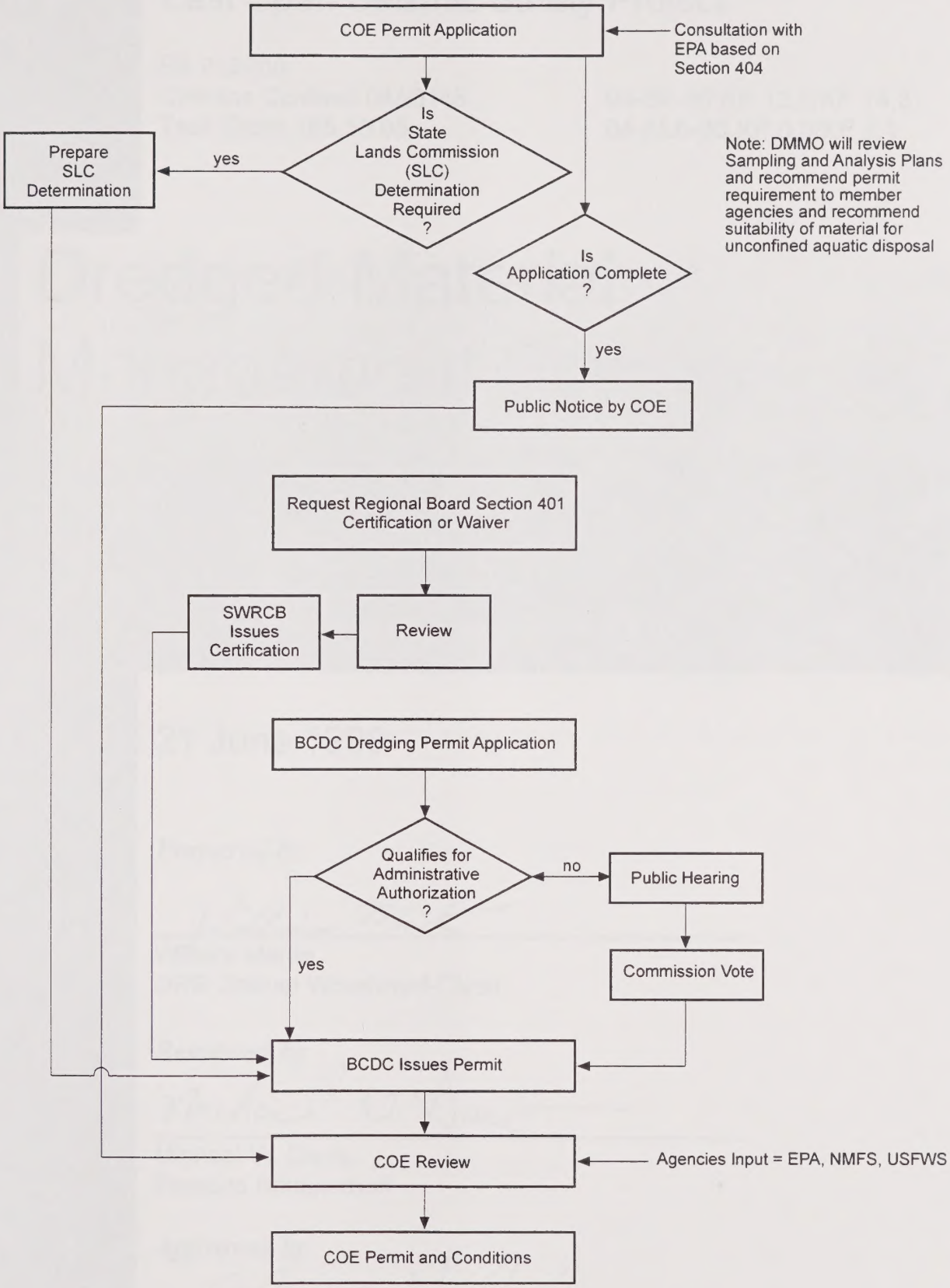
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NOT TO SCALE

Dredged Dismantling Channel
Cross-Section

Figure 3-5

PDQ&D 11/29/00



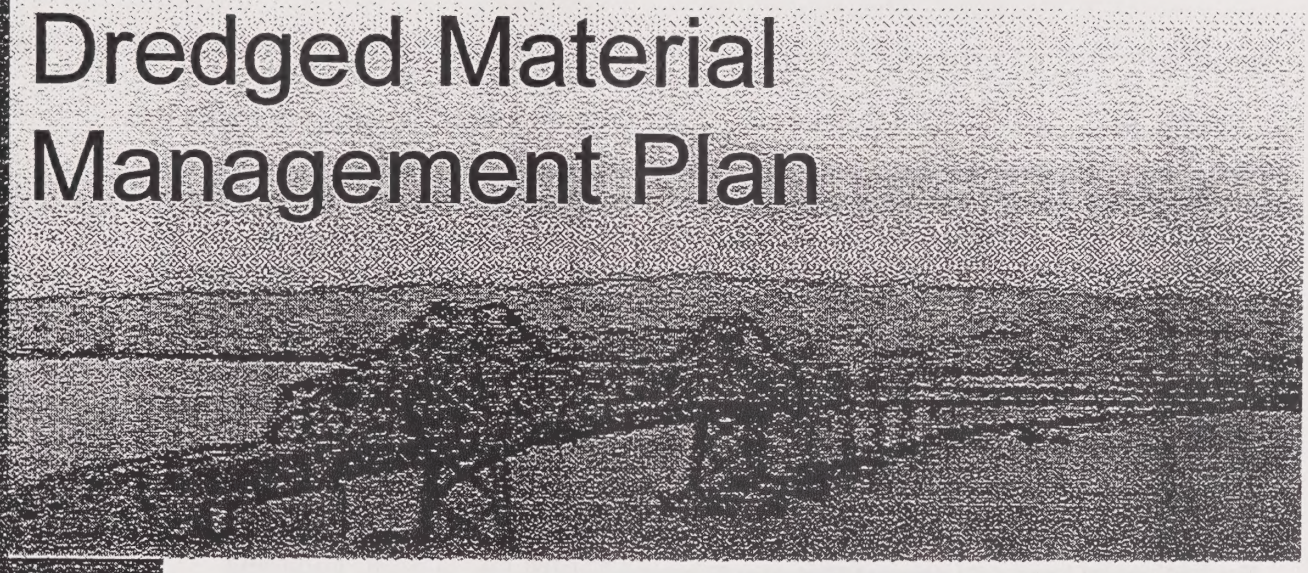
Project No.	SFOBB East Span Seismic Safety Project	IN-BAY DISPOSAL PERMIT PROCEDURES	Figure 6-1

San Francisco – Oakland Bay Bridge
East Span Seismic Safety Project

EA 012000
Caltrans Contract 04A0148
Task Order 165.15.05

04-SF-80 KP 12.2/KP 14.3
04-ALA-80 KP 0.0/KP 2.1

Dredged Material Management Plan



21 June 1999

Prepared by

William Martin
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Caltrans District 4

The San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project is evaluating the retrofit or replacement of the existing SFOBB East Span. Alternatives evaluated are the No-Build; Retrofit Existing Structure; and Replacement Alternatives N-2, N-6, and S-4. Impacts associated with each of these alternatives are addressed in the project's Draft Environmental Impact Statement/Statutory Exemption (DEIS) published September 17, 1998.

This Dredged Material Management Plan (DMMP) provides detailed documentation of dredging activities and reuse/disposal of dredge materials that would be generated by construction activities associated with the build alternatives. The DMMP is being circulated to DEIS distribution list. There will be a 30-day comment period. All comments on this DMMP are due by July 21, 1999 and should be addressed to Mara Melandry, Caltrans District 4, 111 Grand Avenue (P.O. Box 23660), Oakland, California 94623-0660 or by sending e-mail to sfobb.dist04@dot.ca.gov. Comments on the DMMP will be addressed in the Final Environmental Impact Statement/Statutory Exemption.

The DMMP will be presented to the Dredged Material Management Office (DMMO) at a publicly noticed meeting.

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Acronyms

BCDC	San Francisco Bay Conservation and Development Commission
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
COE	U.S. Army Corps of Engineers
Conservancy	California Coastal Conservancy
CZMA	Coastal Zone Management Act
DEIS	Draft Environmental Impact Statement
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Plan
DWR	Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FCWA	Federal Clean Water Act
FHWA	Federal Highway Administration
HAAF	Hamilton Army Air Field
LEDPA	Least Environmentally Damaging Practicable Alternative
LTMS	Long-Term Management Strategy
mcy	million cubic yards
MPRSA	Marine Protection, Research, and Sanctuaries Act
MWP	Montezuma Wetland Project
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NUAD	Not Suitable for Unconfined Aquatic Disposal
ppt	parts per thousand
RMP	Regional Monitoring Program
ROD	Record of Decision
RWQCB	San Francisco Bay Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SF-DODS	San Francisco Deep Ocean Disposal Site

SFOBB	San Francisco-Oakland Bay Bridge
SLC	State Lands Commission
SMMP	Site Management and Monitoring Plan
SUAD	Suitable for Unconfined Aquatic Disposal
SWPPP	Storm Water Pollution Prevention Plan
TSS	Total suspended solids
UWR	Upland/Wetland Reuse
WRDA	Water Resources Development Act
YBI	Yerba Buena Island

1.1 PURPOSE AND NEED FOR THE PROJECT

The San Francisco-Oakland Bay Bridge (SFOBB) is an important part of the Bay Area as it provides regional access between the San Francisco Peninsula and the East Bay. Approximately 350,000 people in 274,000 vehicles currently use the bridge each day. As a component of Interstate 80, it is also a critical link in the interstate network. Figure 1-1 shows the project location.

The purpose of the SFOBB East Span Seismic Safety Project (East Span Project) is to provide a seismically upgraded vehicular crossing for current and future users between Yerba Buena Island (YBI) and Oakland. This project is one of several that the California Department of Transportation (Caltrans) is undertaking to address the overall need to provide a lifeline bridge connection between the cities of San Francisco and Oakland. The other projects include replacing the west approach in San Francisco, retrofitting the West Span, West YBI Viaduct, and YBI tunnel, and the interim retrofit on the East Span.

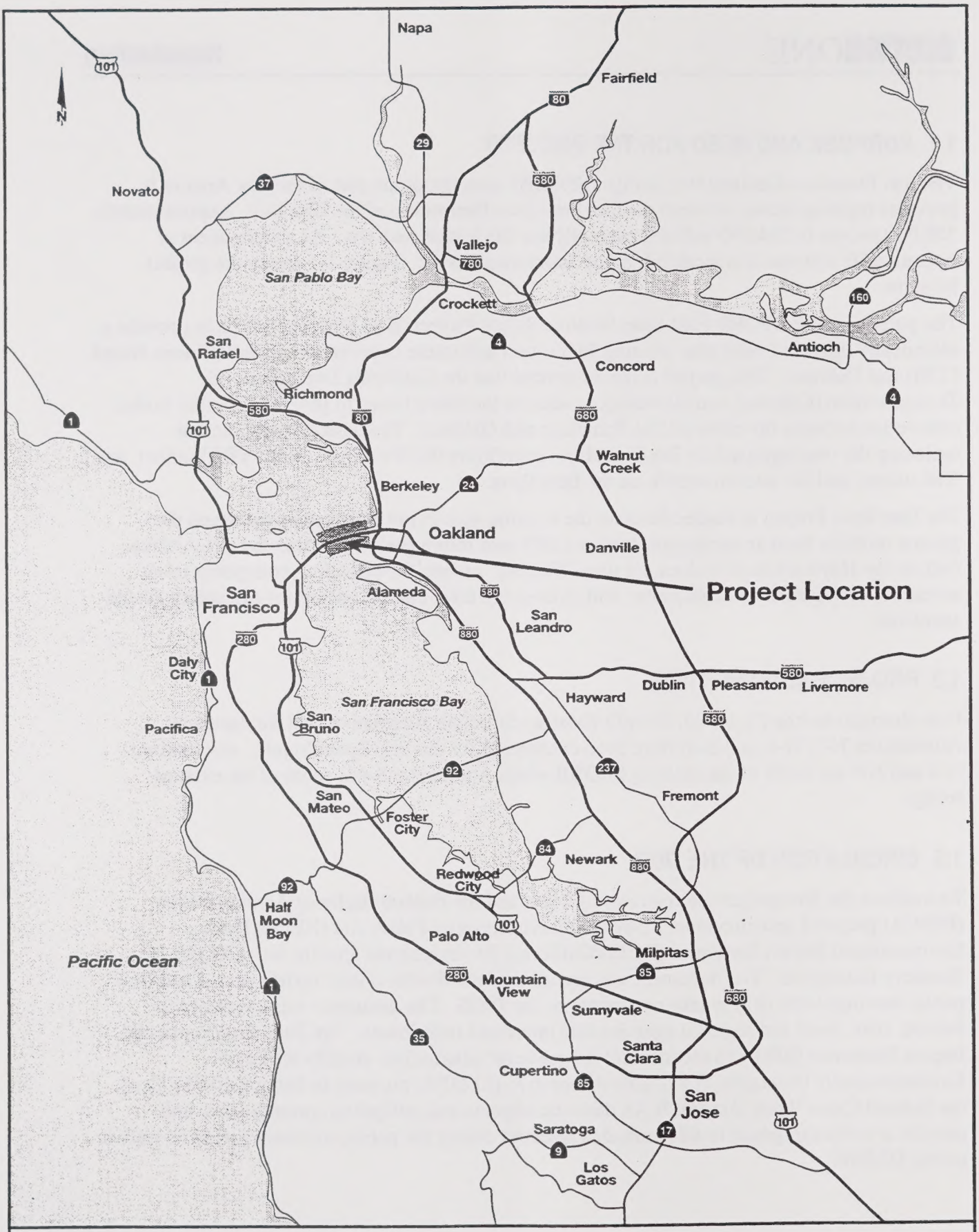
The East Span Project is needed because the existing span is not expected to withstand the ground motions from an earthquake with a 1,500-year return period on either the San Andreas fault or the Hayward fault; it does not meet "lifeline" criteria for providing emergency relief access following such an earthquake; and, it does not meet current operations and safety design standards.

1.2 PROJECT ALTERNATIVES

Five alternatives (the No-Build, Retrofit Existing Structure Alternative, and Replacement Alternatives N-2, N-6, and S-4) have been considered for the East Span Project. Alternatives N-2 and N-6 are north of the existing SFOBB while Alternative S-4 is south of the existing bridge.

1.3 CIRCULATION OF THE DEIS

To evaluate the five project alternatives, Caltrans and the Federal Highway Administration (FHWA) prepared and circulated a National Environmental Policy Act (NEPA) Draft Environmental Impact Statement (DEIS)/California Environmental Quality Act (CEQA) Statutory Exemption. The document was circulated for a 59-day public review period and four public hearings were held to take comments on the DEIS. The document was circulated to federal, state, local and regional agencies and interested individuals. The Final Environmental Impact Statement (EIS) will recommend the preferred alternative, identify the Least Environmentally Damaging Practicable Alternative (LEDPA) pursuant to Section 404(b)(1) of the Federal Clean Water Act (FCWA), describe impacts and mitigation commitments, and provide a written response to all comments received during the public comment period as well as to this DMMP.



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Project Location

Figure 1-1

PDQ&D 3/30/99

1.4 DREDGED MATERIAL MANAGEMENT PLAN PURPOSE AND APPROACH

This Dredged Material Management Plan (DMMP) is a technical report providing documentation of information on the reuse/disposal of dredged materials from to the East Span Project. Impacts and reuse/disposal options addressed in this report would be similar for all the build alternatives, although total dredge quantities would be less for the Retrofit Existing Structure Alternative. The N-6 Replacement Alternative is used in this DMMP to characterize the potential impacts of dredging and disposal. A construction scenario that would result in the maximum foreseeable dredge material quantities was assumed (dredging for new bridge construction and existing East Span dismantling). Differences among the alternatives in construction techniques or material quantities are noted in the text. Figure 1-2 shows the build alternatives.

The DMMP addresses the dredging process for constructing a replacement East Span and dismantling the existing East Span. It describes the estimated amount of materials to be dredged and their composition; potential methods for dredging that may be used; and gives a summary of the potential impacts of dredging that may occur. The DMMP also identifies potential sites for the reuse/disposal of the dredged material and evaluates the impacts of dredged material disposal at these locations. Project dredging activities are addressed in the context of the Long-Term Management Strategy (LTMS). The LTMS is a multi-agency guide for dredged material management decisions in the San Francisco Bay Area.

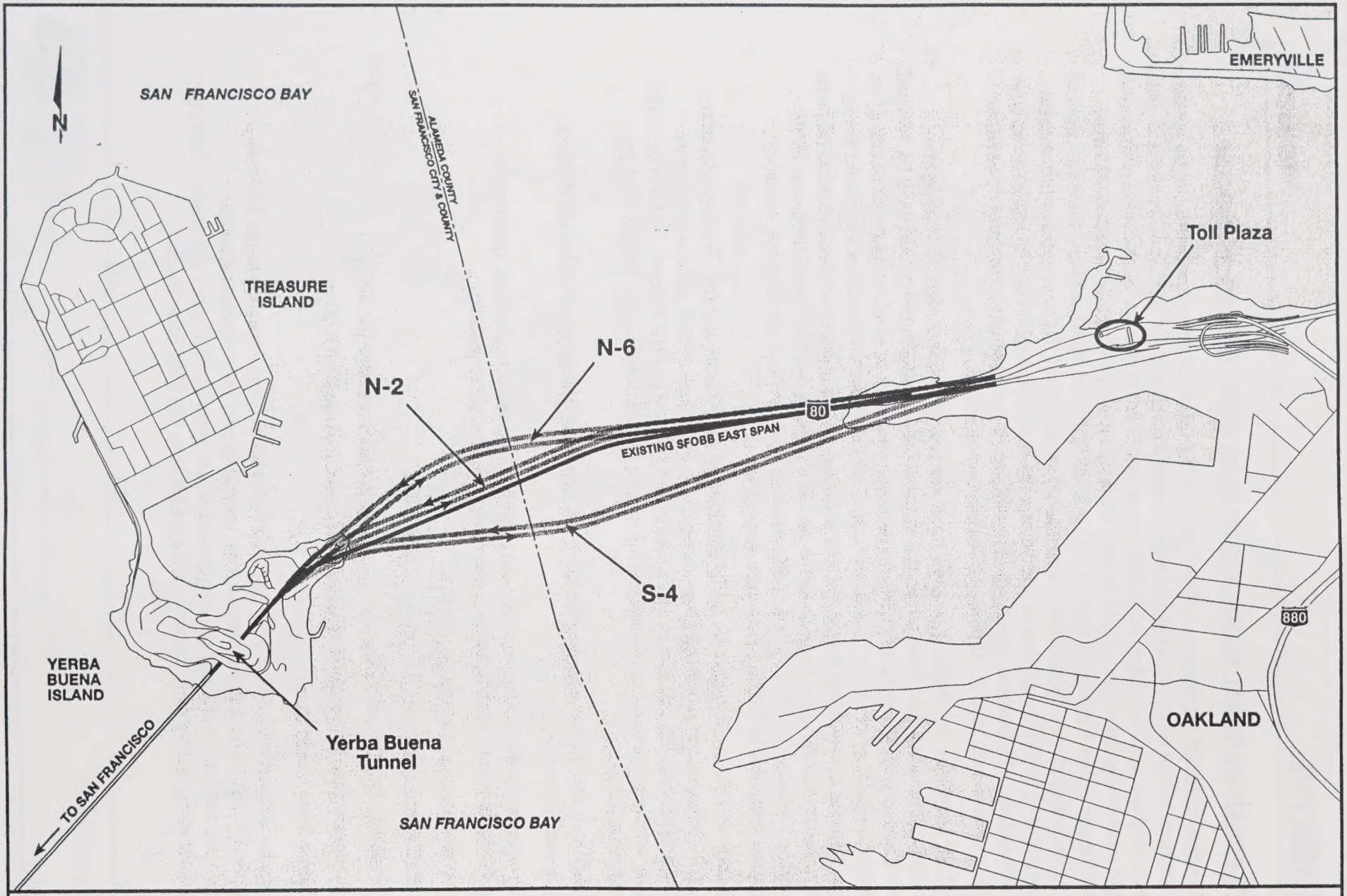
This DMMP will be circulated to the DEIS distribution list. There will be a 30-day comment period. All comments on this DMMP are due by July 21 and should be addressed to Mara Melandry, Caltrans District 4, 111 Grand Avenue (P.O. Box 23660), Oakland, California 94623-0660 or by sending e-mail to sfobb.dist04@dot.ca.gov. Comments on the DMMP will be addressed in the FEIS.

The DMMP will also be presented to the Dredged Material Management Office (DMMO) a publicly noticed meeting.

The multi-agency DMMO seeks to foster a comprehensive and consolidated approach to handling dredged material management issues. Agency members include:

- U.S. Army Corps of Engineers (COE)
- U.S. Environmental Protection Agency (EPA)
- San Francisco Bay Conservation and Development Commission (BCDC)
- San Francisco Bay Regional Water Quality Control Board (RWQCB)
- California State Lands Commission (SLC)

The California Department of Fish and Game provides advice and expertise to the DMMO. Although the DMMO issues a recommendation regarding preferred dredged material management options, individual agencies must still issue specific regulatory approvals. Permits and certifications issued by these agencies are applicable to the East Span Project.



SFOBB EAST SPAN SEISMIC SAFETY PROJECT

GRAPHIC SCALE 1:27,500

0 250 500 1000 m

Project Alternatives

Figure 1-2

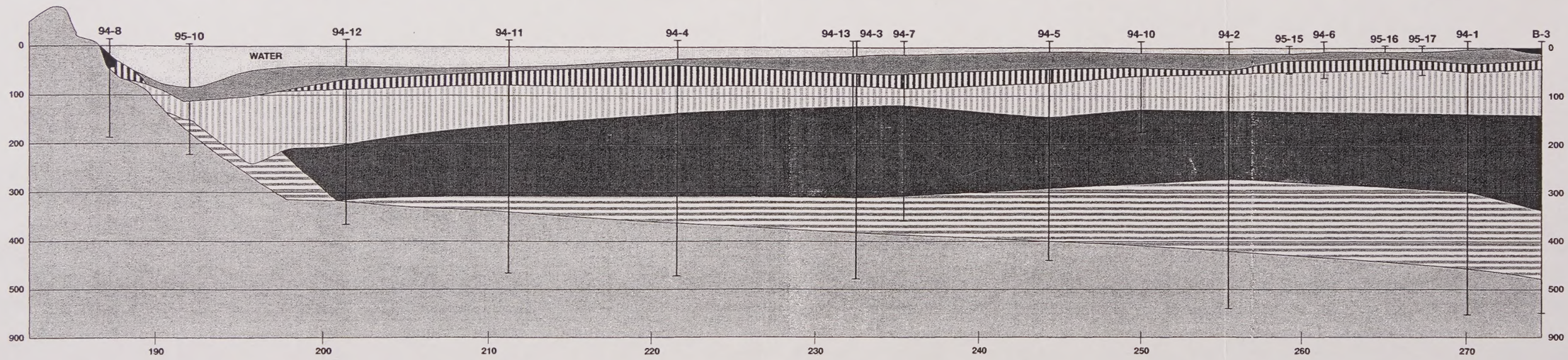
PF F-231 4/15/99

2.1 DESCRIPTION OF TYPES OF MATERIALS

The major geologic formations which underlie the Bay waters in the project area include Young Bay Mud, Merritt Sands, Yerba Buena Mud (Old Bay Mud), the upper and lower Alameda Formations, and Franciscan Bedrock (Figure 2-1). Caltrans has conducted geotechnical investigations of the area. Based on the drilling logs from these studies, the thickness of Young Bay Mud ranges from approximately 1.8 to 15 meters (6 to 50 feet) along the proposed north alignment (N-6). These Young Bay Muds consist primarily of clay, with some silt, sand, and shell fragments. Merritt Sands underlie the Young Bay Mud along much of the alignment.

Sediments encountered during dredging of the construction access and dismantling access channels are expected to consist entirely of Young Bay Muds (see Figure 2-1). Sediment removal during pier construction is expected to encounter all sediment types. Some bedrock will also be removed during pier construction.

Only finer grained materials (Bay Muds and sand) would be suitable for aquatic disposal or upland reuse. Rock, coarse gravel, or materials such as concrete, steel and other construction debris would not be suitable for aquatic disposal/upland wetland reuse and will be taken to the appropriate locations for disposal or recycling. The discussions in the following sections of this DMMP refer only to those types of sediments that are suitable for aquatic disposal, upland disposal, or upland reuse. Steel and concrete debris generated by the dismantling of the existing East Span would be recycled or disposed of upland and would not be placed within areas under the jurisdiction of the COE.



PROFILE

STATIONING INTERVAL = 1000 FEET

VERTICAL EXAGGERATION = 3

ELEVATIONS REFER TO THE MEAN
LOWER LOW WATER DATUM OF 1933 ((MLLW))

LEGEND

- FILL
- YOUNG BAY MUD
- MERRITT/POSEY/SAN ANTONIO FORMATION
- YERBA BUENA MUD (OLD BAY MUD)
- UPPER ALAMEDA FORMATION
- LOWER ALAMEDA FORMATION
- FRANCISCAN BEDROCK

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Geologic Profile of the Project Area

Figure 2-1

PBQ&D F-GP 2/16/99

This section describes the range of anticipated activities involving removal of Bay Mud and soil that construction contractors may undertake within the San Francisco Bay waters to install a new bridge and remove the existing structure. Estimated quantity and quality of the dredged material are also presented in this section.

The following construction techniques, methods, and equipment identified are based on information from other projects and industry practices. Actual construction methods and equipment used on the project would ultimately be chosen by the successful construction bidders.

3.1 PURPOSE OF DREDGING AND EXCAVATION

The purpose of the proposed dredging and excavation activities is to support both construction of the new bridge structure and dismantling of the existing bridge. Specifically, the proposed actions would:

- Excavate within the shallow areas of the east shoreline of the Bay, i.e., less than 4.3 meters (14 feet) below mean low low water (MLLW), to allow in-water access for barges and equipment that are necessary for construction of the new bridge and removal of the existing structure;
- Excavate and remove materials necessary for installation of piers, footings, and foundations for the new bridge; and
- Excavate or remove existing East Span piers, footings, and foundations during dismantling.

3.2 ACCESS DREDGING FOR CONSTRUCTION

Because the bridge involves construction in shallow water areas of the San Francisco Bay, it will be necessary to dredge a channel to allow access for the heavy equipment and materials required for construction. This is true for all bridge alternatives. The contractors will use barges to support cranes and pile driving equipment, transport construction materials, and provide above-water platforms from which to work. Since portions of the Bay within the project limits are shallow, especially near the Oakland shoreline, dredging will be required to provide adequate draft for these barges to access and work at the construction site. After construction is completed the access channel would be allowed to refill through natural sedimentation processes.

3.2.1 Construction Activities Requiring Barge Access

The draft, or depth of displacement, of the barges used will vary, but is expected to range from as shallow as 1.8 meters (6 feet) up to 3.7 meters (12 feet). A maximum depth of 4.3 meters (14 feet) has been assumed to account for overdredging that sometimes results from some types of mechanical dredging. Barge draft will ultimately depend upon the construction technique and equipment used by each of the contractors performing different tasks during construction. For example, one of the earliest stages of construction involves the driving of piles that will ultimately provide the foundation and support of the "skyway" portion of the new bridge. The majority of the skyway will be supported on 2.5-meter (8-foot) diameter piles, except nearest to the Oakland shoreline where the pile size is reduced to 1.5 meters (5 feet) in diameter. These piles will be installed by driving a steel casing to below Bay Mud and into Merritt Sand. Piles

are approximately 90 meters (300 feet) in length. The stability of the piles, and ultimately the bridge structure itself, is dependent upon the ability to properly drive and penetrate these piles into the Merritt Sands beneath the Bay. Consequently, the barges that are necessary to support a pile driver that can accomplish this task must have sufficient lifting capacity and stability to hoist the piles into place and drive them at an efficient rate. The alternative of using a greater number of smaller diameter piles, and potentially a smaller pile driver, to achieve the same foundation support for the bridge creates a greater pile cap mass, which is potentially less stable under earthquake conditions. Thus, to provide optimum performance of the bridge under the dynamic load of seismic shaking requires that relatively deep draft barges be used to support the requisite pile driving activity.

Once driven, the water within the top portion of the pile casing may be pumped and discharged into the Bay in accordance with SWPPP requirements. Techniques such as reverse circulation drilling, jetting, and air lifting may be used by the contractors to remove the "plug" of material within each of the driven piles. These methods generally involve creating a slurry of material within the hollow pile, and lifting or pumping the slurry from the pile into the drilling vessel or a barge. Alternatively, contractors working on other bridge projects have removed large diameter pile plugs by mechanical means through clamshell excavation of the pile core.

As the bridge is constructed, partially or entirely prefabricated sections of the bridge may be barged to their designated locations and then raised into place for installation. Barges would be used for these operations as work platforms to raise large segments of the bridge, and to transport materials and equipment to and from the work sites.

3.2.2 Dredging Techniques and Options

Dredging techniques vary considerably in the types of equipment and methods employed (LTMS 1998, U.S. Army Corps of Engineers 1983). However, dredging techniques can be generally categorized as either hydraulic or mechanical. *Hydraulic* methods involve the removal of loosely compacted materials through suction techniques. Loosely compacted materials that can be removed by hydraulic methods would typically be fine grained sediments that have not yet naturally settled, or have been loosened and entrained in the water column by mechanical or hydraulic means. Hydraulic dredging may involve the use of equipment and methods referred to as cutterheads, dustpans, hoppers, hydraulic pipelines, plain suction, and sidecasters. Hydraulic dredging techniques can have the general advantage of minimizing disturbance and resuspension of sediments at the dredging site. However, this technique can also involve entrainment of high volumes of water many times the quantity of the sediments removed. The generated water and sediment must ultimately be discharged, either at the dredging site or at an approved dewatering or disposal location.

Mechanical dredging typically involves the removal of more compacted materials by equipment such as clamshell, dipper, or ladder dredges. These techniques involve removing sediments by dislodging and excavating the material, and then raising it to the surface and discharging it into a barge or scow. Equipment may involve backhoes, buckets (including different types referred to as clamshell, orange-peel, dragline, bucket ladder, bucket wheel, and dipper dredges). Mechanical dredging has the advantage of minimizing disposal quantities because little additional water is entrained by the equipment. Its disadvantages are that some types of

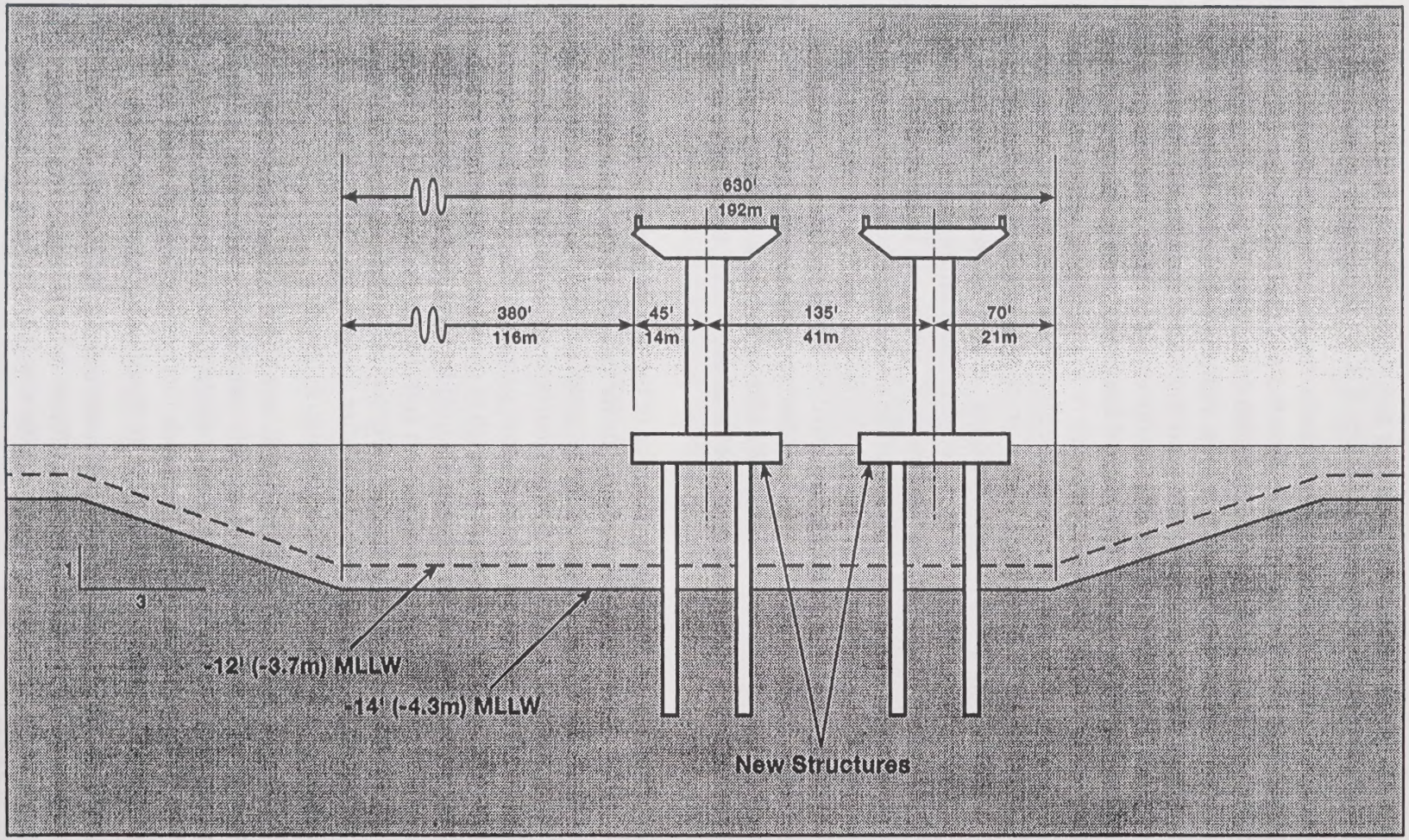
equipment and methods can create undesirable disturbance and resuspension of sediments through the mechanical excavation and removal of the material at the dredging or excavation site.

The nearby Port of Oakland is currently dredging their harbor areas and access channels to a 12.8-meter (42-foot) depth, and the Port has plans to deepen these channels further to 15 meters (50 feet). Their dredging operations have involved cutterhead dredges for areas of cemented Merritt Sands and Bay Mud, and derrick barges that support clamshell bucket dredging. The cutterhead is a hydraulic type dredge, equipped with a rotating cutter apparatus surrounding the intake end of a suction pipe. These dredges can efficiently dig and remove a wide range of types of alluvial material and compacted deposits. The excavated materials can be pumped off-site from the actual dredging operation, up to several miles away to a handling, reuse, or disposal facility. Clamshell dredging involves the use of a bucket dredge operated from a crane, where the materials are dug and removed by dropping a bucket in an open position into the sediment. The sides or jaws of the bucket are closed to shear the material, and the bucket is hoisted up, swung over and released into a hopper barge or scow. If contaminated sediments, such as those present at the Port of Oakland are identified, an "environmental" bucket can be used which effectively seals upon closure and minimizes the release of the excavated materials during the excavation action. For areas that have not been previously dredged, such as at the East Span alignment, both of these dredge techniques might be employed by the contractors. Potentially two dredging passes might be made, where the first pass is used to remove the loose, unconsolidated materials on top. The second pass might involve the use of a sealed clamshell bucket with teeth or, if necessary, a cutterhead dredge capable of excavating the more compacted, deeper materials.

A typical cross section of the dredge channel for installation of the new bridge is shown in Figure 3-1. Figures 3-2 through 3-4 show estimated dredging limits for each of the replacement alternatives. Dredging limits have been estimated for both "upper" and "lower" limit dredging scenarios. The upper limit scenario would use dredged channels to allow for barge access for construction of all portions of the bridge located over shallow water. The lower limit scenario would use trestles, falsework, or fill as a platform from which to construct nearshore portions of the bridge. The proposed access channel for construction would be placed on the north side of the proposed bridge alternatives. The anticipated maximum draft for the barges is 3.6 meters (12 feet), but to ensure adequate clearance over potential irregularities in channel depth and to allow for some potential resettlement of materials in the channel after dredging, the EPA has recommended overdredging to a 4.3 meter (14-foot) maximum depth.

Because a derrick barge using a clamshell or sealed bucket is capable of dredging down to the 4.3-meter (14 foot) depth necessary for barge access, and this technique minimizes the amount of dredged material, it is a method that the dredging contractor might be expected to employ. Use of this method at the Port of Oakland yielded dredge materials that consisted of about 80 percent solids, and could be adequately dewatered for transport by truck within about one week.

Another option to dredging in nearshore areas might be to install trestles, falsework, or fill platforms and conduct a portion of the work from these platforms rather than from a barge. Installation of a temporary trestle, if feasible, would reduce the extent of dredging necessary at the Oakland shoreline, and might reduce some of the identified impacts to shoreline and nearshore resources such as eelgrass beds and tidal areas. This option would slightly reduce the total dredged volumes (see Figures 3-2 through 3-4 for limits of dredging and/or trestles).



View: Looking East, North Side of Replacement Alternative N-6

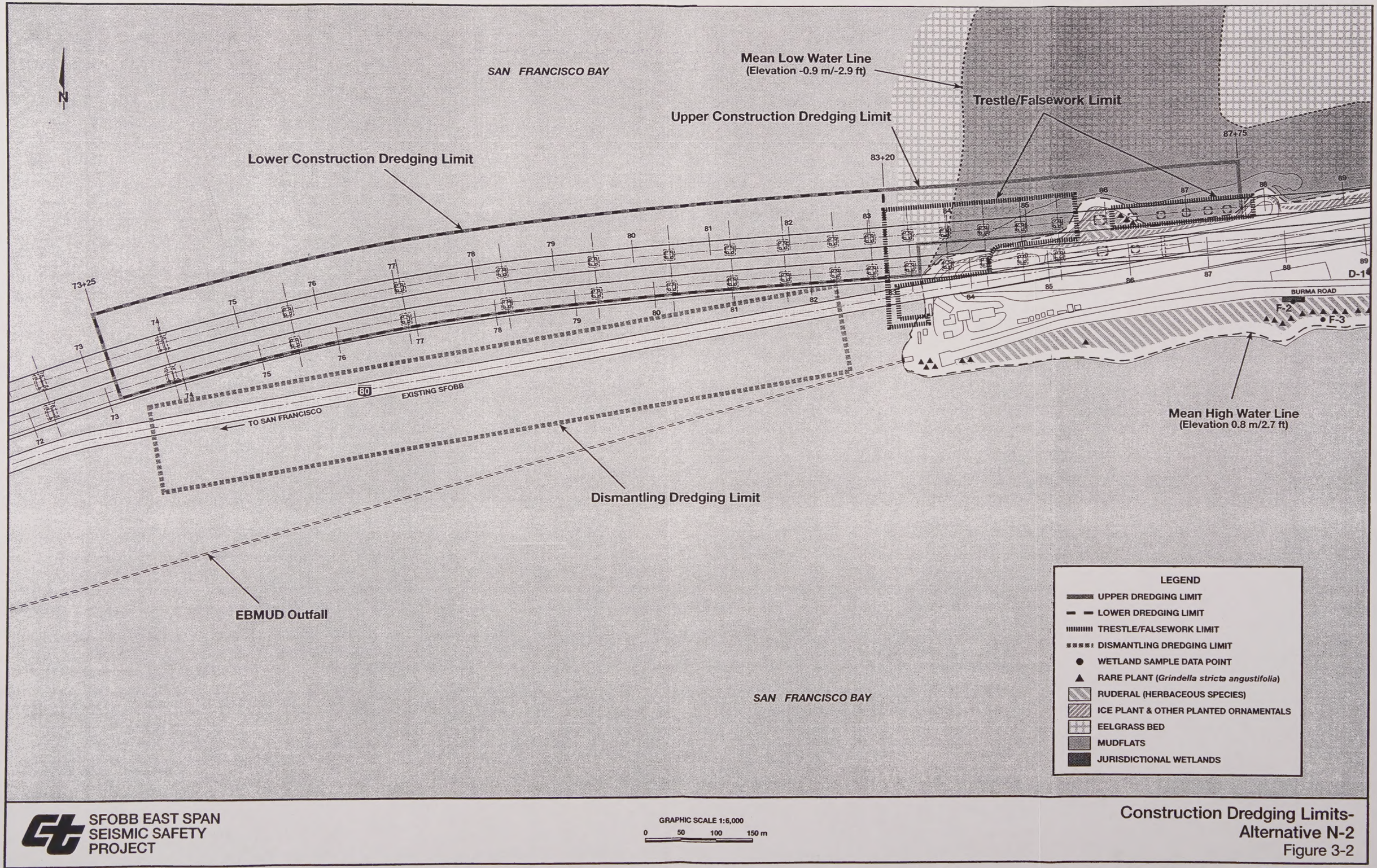
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NOT TO SCALE

Dredged Construction Channel
Cross-Section

Figure 3-1

PDQ&D 4/19/99



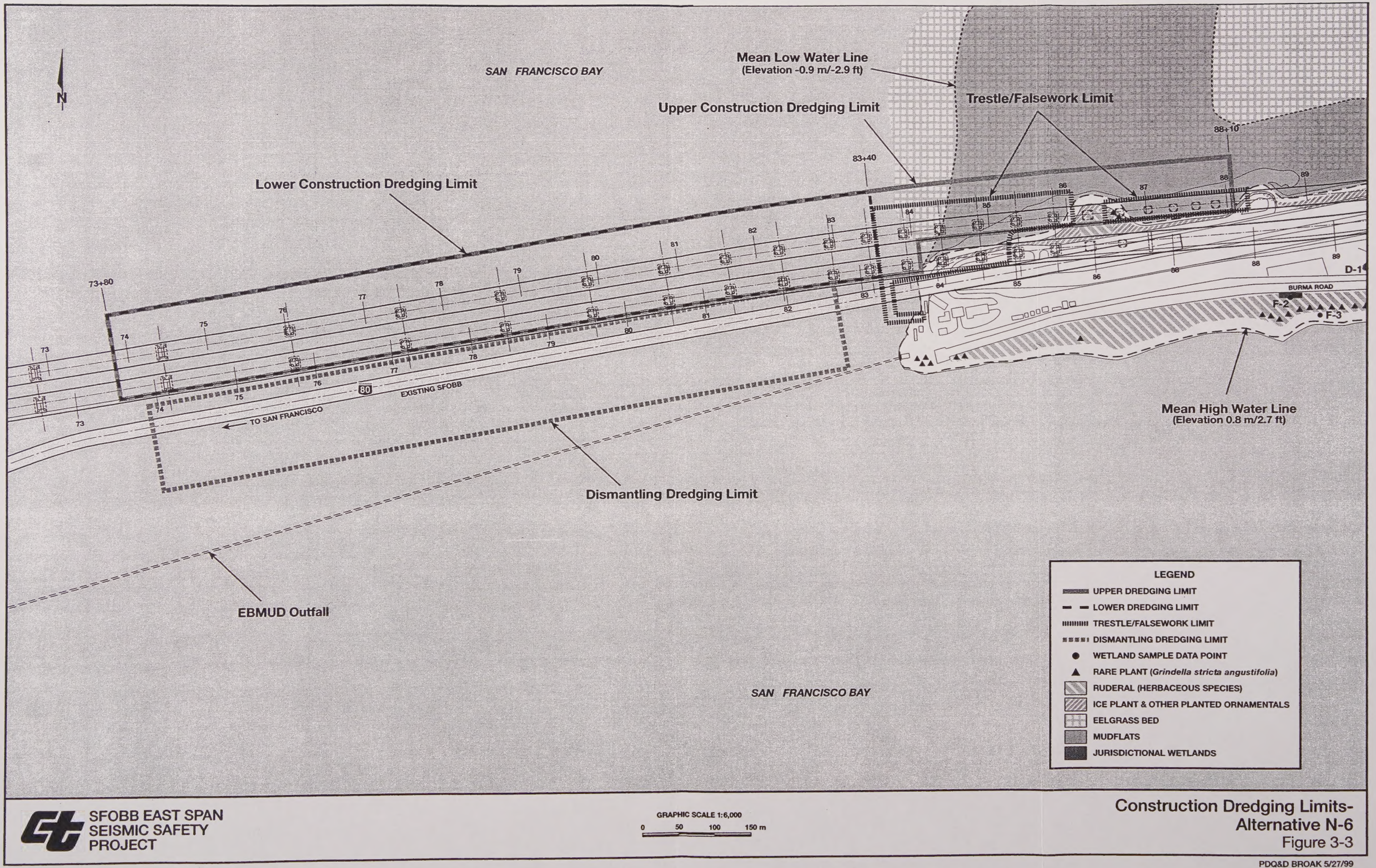
SFOBB EAST SPAN SEISMIC SAFETY PROJECT

GRAPHIC SCALE 1:6,000
0 50 100 150 m

Construction Dredging Limits- Alternative N-2

Figure 3-2

PDQ&D BROAK 6/10/99



SFOBB EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:6,000
0 50 100 150 m

Construction Dredging Limits-
Alternative N-6
Figure 3-3

PDQ&D BROAK 5/27/99

LEGEND

- UPPER DREDGING LIMIT
- LOWER DREDGING LIMIT
- TRESTLE/FALSEWORK LIMIT
- DISMANTLING DREDGING LIMIT
- WETLAND SAMPLE DATA POINT
- RARE PLANT (*Grindella stricta angustifolia*)
- RUDERAL (HERBACEOUS SPECIES)
- ICE PLANT & OTHER PLANTED ORNAMENTALS
- EELGRASS BED
- MUDFLATS
- JURISDICTIONAL WETLANDS

N

SAN FRANCISCO BAY

Mean Low Water Line
(Elevation -0.9 m/-2.9 ft)

Dismantling Dredging Limit

80

TO SAN FRANCISCO

EXISTING SFOBB

BURMA ROAD

D-1

F-2

F-3

Mean High Water Line
(Elevation 0.8 m/2.7 ft)

84+80

EBMUD Outfall

81+95

Trestle/Falsework Limit

Upper Construction Dredging Limit

Lower Construction Dredging Limit

70+75

SAN FRANCISCO BAY

SFOBB EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:6,000
0 50 100 150 m

Construction Dredging Limits-
Alternative S-4
Figure 3-4

PDQ&D BROAK 6/10/99

However, temporary disturbance to these areas would still occur since the trestle would have to be both installed and removed by the contractor. Use of trestles would be dependent upon whether a contractor could install necessary bridge piers from temporary trestles or fill platforms.

3.3 ACCESS DREDGING FOR DISMANTLING

After the new bridge is constructed, the existing bridge will be dismantled. The techniques for dismantling the existing East Span involve separating and removing large, essentially intact pieces of the span. The pieces will be dismantled and lowered onto large barges, then transported to an upland site for further dismantling and appropriate disposal. Similar to construction of the new span, areas near the Oakland Touchdown are too shallow to accommodate the large barges needed to complete the dismantling process; thus an access channel will need to be dredged. Figure 3-5 shows the cross section of the area that will be dredged for barge access. A plan view of the access channel was shown in Figures 3-2, 3-3, and 3-4 (the channel is the same for all alternatives). This channel will be approximately half as wide as the channel for construction access, but the depth will be similar at 4.3 meters (14 feet). Dredging for this access channel will use the same techniques described in Section 3.2.2 for construction barge access. As with the access channel for construction, the dismantling access channel will be allowed to refill through natural sedimentation.

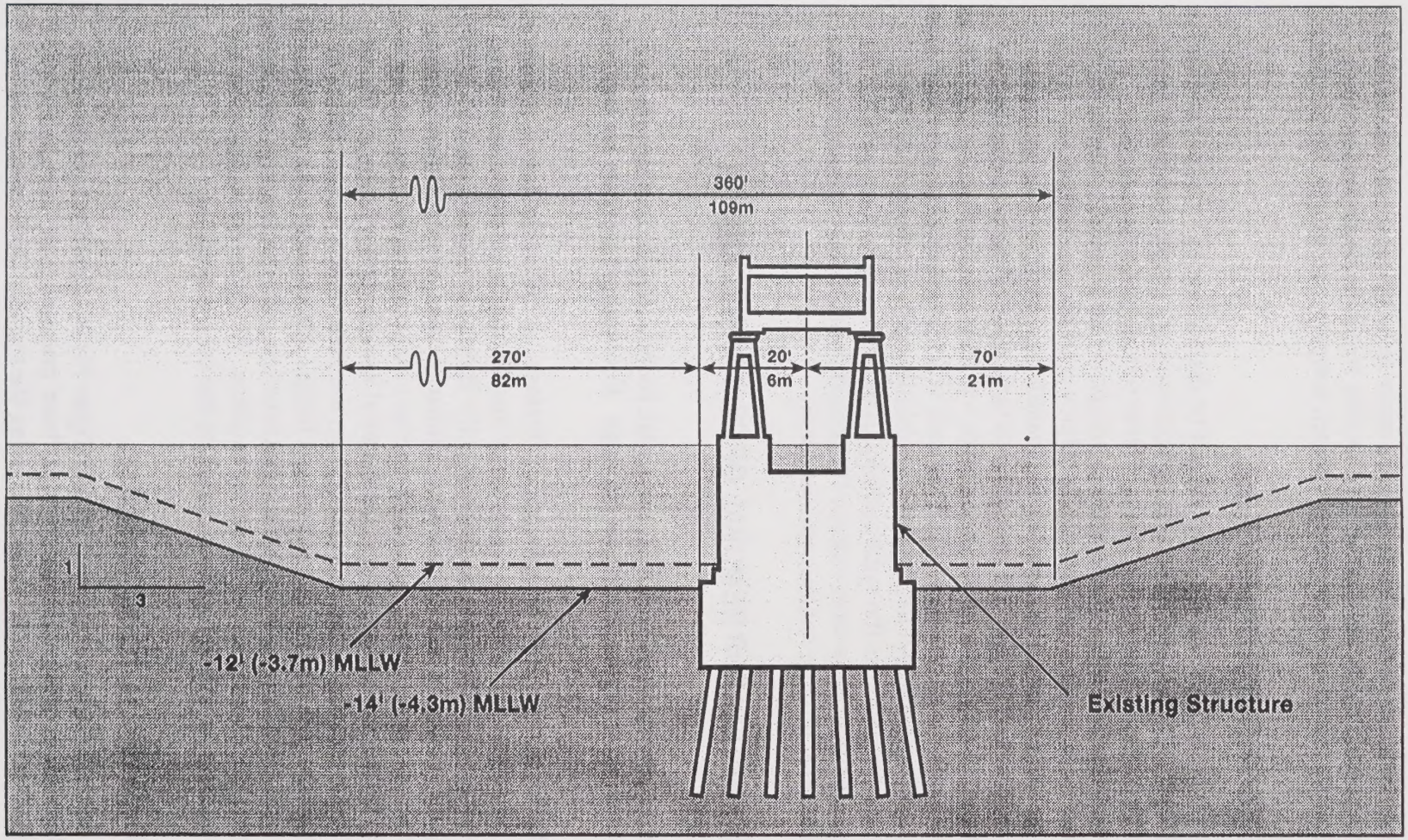
3.4 SEDIMENT EXCAVATION FOR REMOVAL OF EXISTING BRIDGE FOUNDATIONS

Once the existing bridge superstructure is removed, the bridge foundations will be removed. This will require excavation of sediments around the footings. Footing locations are shown in Figure 3-6.

To accomplish this, coffer dams will be placed around the footings. A coffer dam is a temporary enclosure which can be dewatered, allowing construction or installation of structures around the foundation footings. Overlying water may be discharged to the Bay in accordance with SWPPP requirements. The sediment would then be removed in a similar manner to sediment removal for pile construction for the new span. Techniques such as reverse circulation drilling, jetting, and air lifting may be used by the contractors to remove the material around the footings. These methods generally involve creating a slurry of material within the hollow pile, and lifting or pumping the slurry from the pile into the drilling vessel or a barge. Alternatively, the material may be removed by mechanical means through clamshell excavation. The footings would then be removed and existing piles would be cut off below the mudline. Once the coffer dams are removed, natural sedimentation will fill the areas surrounding the cut-off piles.

3.5 QUALITY OF MATERIAL TO BE DREDGED

Testing sediments to be dredged and excavated for the East Span Project is not yet complete. A Sampling and Analysis Plan (SAP) for sediment testing has been prepared (see Caltrans 1999) and approved by the DMMO. Caltrans is currently conducting the testing. Sediments were tested in 1996 for retrofit of the existing bridge and, given the close proximity to the replacement



View: Looking West, South Side of Existing SFOBB

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

NOT TO SCALE

Dredged Dismantling Channel
Cross-Section

Figure 3-5

DQ&D 4/19/99

N

ALAMEDA COUNTY
SAN FRANCISCO CITY & COUNTY

N-6

E-23 E-22 E-21 E-20 E-19 E-18 E-17 E-16 E-15 E-14 E-13 E-12 E-11 E-10 E-9 E-8 E-7 E-6 E-5 E-4 E-3 E-2

80

EXISTING SFOBB

EBMUD Outfall

YERBA
BUENA
ISLAND

SAN FRANCISCO BAY

OAKLAND

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:12,000
0 100 200 300 400 500 1000 m

Existing Bridge Footing Locations

Figure 3-6

PBQ&D F-8 2/16/99

alternatives, the results of this testing can provide some insight as to what might be expected when sediment testing for the new span is completed.

Sediment samples were collected in July 1996 from the upper 1.8 meters (six feet) of sediment around each of the East Span piers, as required by the DMMO. Laboratory characterization included physical and chemical analysis and both suspended and solid phase bioassay tests. Results of the physical testing showed that the sediments were primarily sand with lesser and approximately equal percentages of silt and clay. Although chemical analyses detected some contaminants, suspended phase and solid phase bioassay tests indicated that most of the sediments were Suitable for Unconfined Aquatic Disposal (SUAD) and would not cause adverse effects to marine biota. Of the approximately 199,000 m^3 (260,000 cy) that were to be dredged for the SFOBB Retrofit Project, approximately 190,000 m^3 (249,000 cy) were suitable for aquatic disposal. The remaining 9,000 m^3 (11,000 cy) were Not Suitable for Unconfined Aquatic Disposal (NUAD) and would have been disposed of at an appropriate upland site. The volume of material found to be NUAD was primarily due to physical characteristics (much of the material was upland soil) and not due to chemical contamination.

Based on this testing, and the percentages of suitable versus unsuitable material identified, estimates of suitable vs. unsuitable material were made for purposes of this DMMP. Actual amounts of suitable and unsuitable materials may be different, based on testing of the sediments along the specific alignment of the new span. Suitability refers to the chemical, biological, and physical properties of the sediment.

According to the LTMS Sediment Classification Framework (LTMS 1998), SUAD material is chemically and biologically suitable for any reuse option and can be placed in a wide variety of locations, including in-Bay, ocean, construction, landfills, and can be used to create wetlands. NUAD materials may not be biologically and/or chemically suitable for use in all environments. There are three classes of NUAD material. Category 1 material can be used in wetland creation as "non-cover" material if SUAD materials are used to cap the NUAD material. NUAD Category 2 material requires additional analyses and may or may not be suitable as wetland non-cover material. NUAD Category 3 material generally must be taken to appropriate landfills. For this document, it is assumed that any NUAD material would be taken to a landfill.

3.6 SUMMARY OF DREDGED MATERIAL VOLUMES

Tables 3-1 and 3-2 present a summary of dredged material volumes, according to activity, for the three Replacement Alternatives. The estimated dredged quantities for the N-2 and N-6 Alternatives are the same. The S-4 Alternative would result in slightly higher volumes than N-2/N-6 under the "lower limit" scenario, while the "upper limit" scenario would dredge approximately 100,000 m^3 less material than N-2/N-6. Less volume would be dredged for the S-4 Alternative upper limit scenario because water depths in the nearshore areas are somewhat greater to the south of the bridge; thus less material would need to be dredged to achieve the 4.3 meter (14 foot) working depth for the construction barges.

Table 3-1

Estimated Dredged Quantities for the N-2 and N-6 Alternatives

Cubic Meters (Cubic Yards)[1]

Dredging Area	Dredged Material to Construct New Piers and Footings		Dredged Material from Construction Access to Construct New Bridge		Dredged Material from Construction Access to Dismantle Existing Bridge	Dredged Material from Removal of Existing Bridge Piers to Mudline	Total
	SUAD[2]	NUAD[3]	SUAD	NUAD	(SUAD)	(SUAD)	
With Trestle/ Falsework (lower limit)	32,000 (42,000)	6,000 (7,000)	104,000 (135,000)	0	116,000 (152,000)	5,000 (6,000)	Total lower limit volume: 262,000 (343,000)
Without Trestle/ Falsework (upper limit)	32,000 (42,000)	3,000 (3,000)	173,000 (226,000)	109,000 (142,000)	116,000 (152,000)	16,000 (21,000)	Total upper limit volume: 448,000 (585,000)

Source: Parsons Brinckerhoff, January 26, 1999.

1. Figures rounded to nearest thousand.
2. SUAD = Suitable for Unconfined Aquatic Disposal.
3. NUAD = Not suitable for Unconfined Aquatic Disposal. (Estimated based on existing sediment data collected in 1996 for the retrofit project.)

Table 3-2

Estimated Dredged Quantities for the S-4 Alternative

Cubic Meters (Cubic Yards)[1]

DREDGE QUANTITIES							
Dredging Area	**Dredged Material to Construct New Piers and Footings**		**Dredge Material from Construction Access to Construct New Bridge**		**Dredge Material from Construction Access to Dismantle Existing Bridge**	**Dredge Material from Removal of Existing Bridge Piers to Mudline**	**Total**
	SUAD	NUAD	SUAD	NUAD			
With Trestle/Falsework							Total Lower Limit Volume
(Lower Limit)	32,000 (42,000)	6,000 (7,000)	111,000 (145,000)		116,000 (154,000)	5,000 (6,000)	269,000 (352,000)
Without Trestle/Falsework							Total Upper Limit Volume
(Upper Limit)	32,000 (42,000)	3,000 (3,000)	169,000 (221,000)	0	116,000 (154,000)	16,000 (21,000)	335,000 (438,000)

Source: Parsons Brinckerhoff, March 12, 1999

1 Figures rounded to nearest thousand.

2. SUAD = Suitable for Unconfined Aquatic Disposal

3. NUAD = Not Suitable for Unconfined Aquatic Disposal (Estimated based on existing sediment data collected in 1996 for the retrofit project).

The dredging footprints for new piers, footings and the access channel are shown on Figures 3-2, 3-3 and 3-4. It is assumed that the channel would extend from the point where the depth of the Bay drops below 4.2 meters (14 feet) to where the bridge is almost entirely on land at the Oakland shoreline. Use of a trestle, falsework, or fill extending west from the Oakland Touchdown area would provide an above water area from which to construct this segment of the bridge, and would minimize the amount of dredging needed as shown on Figures 3-2, 3-3, and 3-4.

Access dredging volumes for removal of the existing piers and bridge structure are also listed in Tables 3-1 and 3-2, and Appendix A and footprints are shown on Figures 3-2, 3-3, and 3-4.

Dredging of these volumes will not occur at one specific time in the project. Rather, dredging and dredge material reuse/disposal will occur throughout the project schedule. Most of the volumes, however, will be generated during two periods: 1) dredging of the construction access channel, near the beginning of the project and 2) dredging of the access channel to dismantle the existing bridge toward the end of the project. Figures 3-7 and 3-8 show anticipated monthly volumes over the course of new bridge construction and dismantling of the existing bridge.

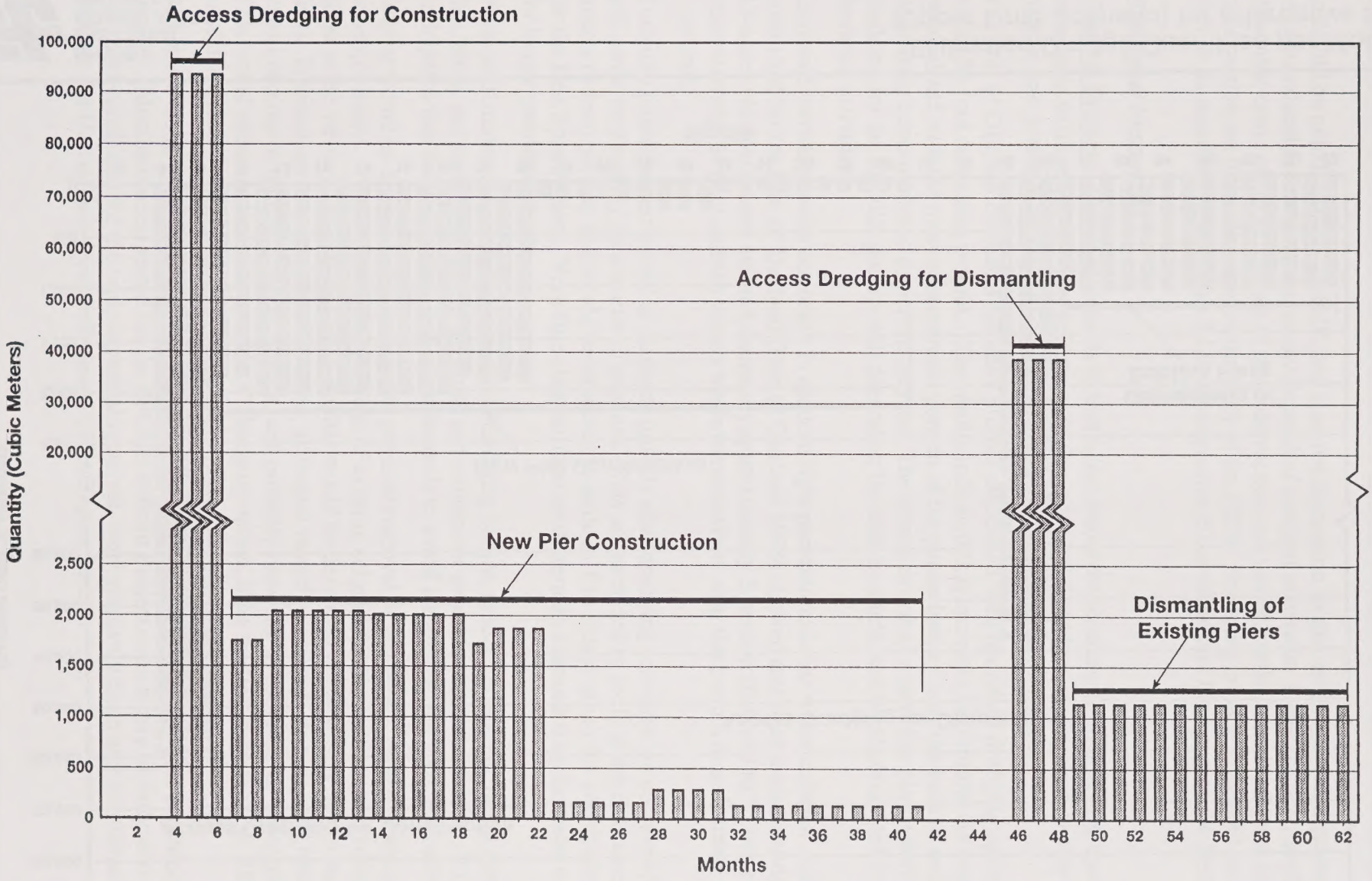
For the N-2 and N-6 Alternatives (Figure 3-7) total of approximately 281,000 m^3 (366,000 cy) will be dredged during months 4 through 6 for construction barge access (upper limit dredging scenario). Volumes will drop between months 7 to 22 to about 2,000 m^3 (2,600 cy) per month once sediment removal for westbound pier construction begins. This volume would amount to approximately one barge trip per month to an approved reuse/disposal site. Volumes would drop even further to approximately 150 to 300 m^3 (200 to 400 cy) per month during construction of eastbound piers. No sediment removal is anticipated between months 42 and 45.

Dredge volumes for the S-4 Alternative are similar to N-2 and N-6 for most of the project, except that quantities for the construction access dredging are lower near the beginning of the project (Figure 3-8).

As dismantling of the existing bridge begins, approximately 116,000 m^3 (152,000 cy) will be dredged for creation of the barge access channel (months 46 to 48). Volumes then drop to approximately 1,200 m^3 (1,600 cy) per month, representing sediment dredged to remove existing bridge footings and cutting the existing piles off at or below the mudline.

3.7 DREDGING IMPACTS AND MITIGATION

This section discusses potential impacts associated with dredging operations (biological and water quality issues) during construction of the East Span. Numerous studies have been conducted concerning the general aquatic impacts of dredging operations in San Francisco Bay. Both the recent LTMS EIS (LTMS 1998) and the Port of Oakland 50-foot Dredging Project EIS (Port of Oakland 1998) have information on the potential impacts of dredging. Information utilized in this section was obtained primarily from those documents. The dredging impacts described in this section are generally similar for all Replacement Alternatives. Alternative-specific impacts are discussed when differences occur.

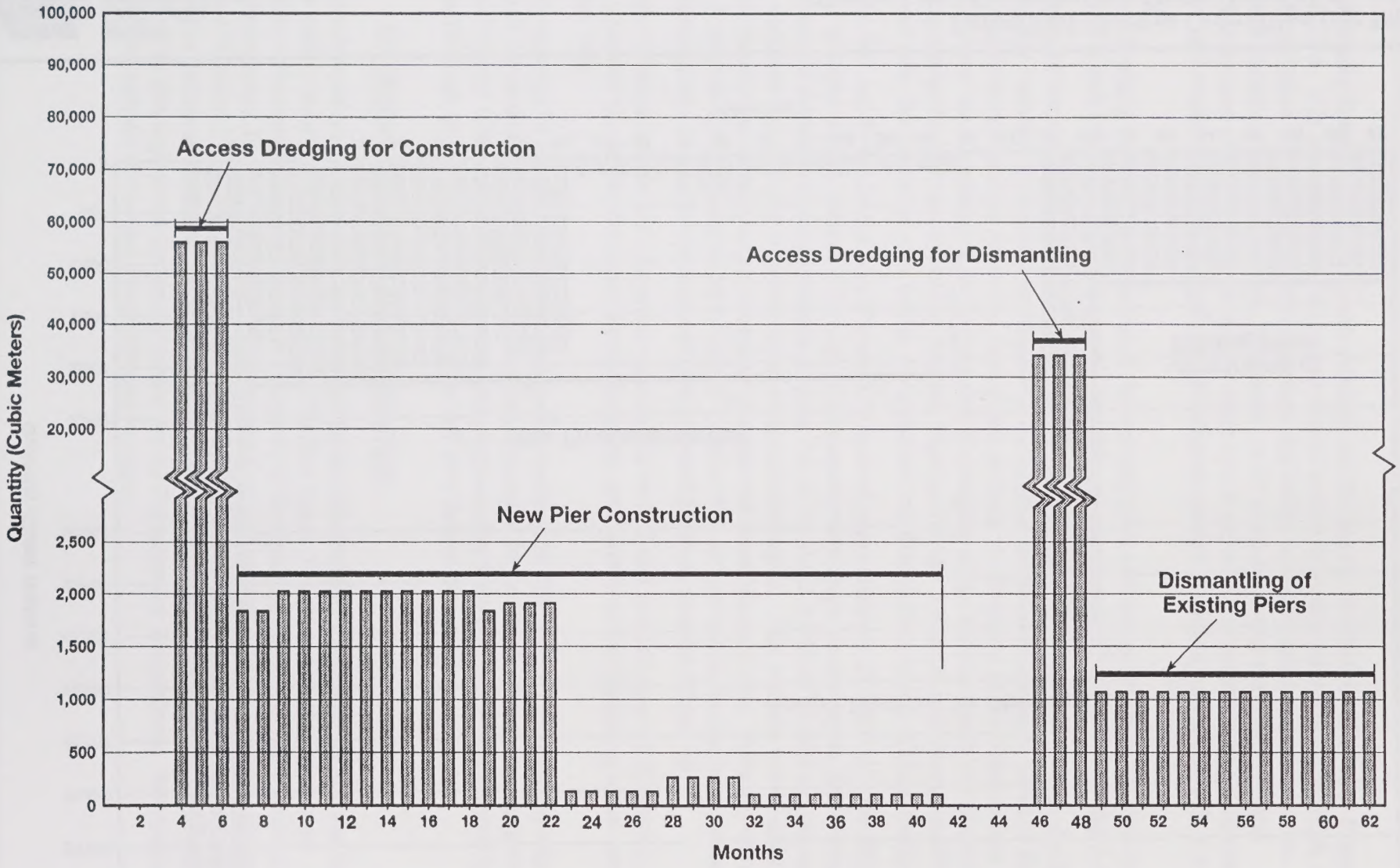


SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Estimated Dredge Quantities per Month
(Upper Limit Scenario) for Alternatives N-2 and N-6

Figure 3-7

PBQ&D F-DQ 6/15/99



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Estimated Dredge Quantities per Month
(Upper Limit Scenario) for Alternative S-4

Figure 3-8

PB -DQ 6/15/99

It should be noted that this DMMP, and thus the discussion in this section, focuses primarily on impacts related to dredging and reuse/disposal of dredged materials. Other impacts, such as those that could occur as a result of the construction and use of trestles, falsework, and fill during construction are fully discussed in the body of the FEIS. Dredging impacts presented here will also be summarized in Section 4.14.9--Construction Excavation and Dredging in the FEIS.

Biological Resources

General Impacts. Potential impacts to biological resources resulting from dredging operations are related to increases in water column turbidity, physical disturbance, alteration or loss of habitat, and potential releases of contaminants associated with the sediments.

The Port of Oakland evaluated turbidity plumes associated with clamshell dredging operations for its 50-foot deepening project. The results indicated that increases in turbidity are expected to be localized with the most concentrated portion of the plume located near the bottom and with decreasing concentrations nearer the surface. The lateral extent of a turbidity plume during dredging for the SFOBB project will depend on the tide, currents, and wind conditions during the dredging activities.

Increased turbidity levels can result in reduced light penetration in the water column. Studies conducted for the Port of Oakland (Port of Oakland 1998) showed that light transmissivity in a 13-meter (42-foot) water column decreases approximately 5 percent (from 40 to 35 percent transmissivity) in near-surface waters while transmissivity near the bottom may decrease to only 5 percent.

Turbidity plumes are expected to dissipate quickly after dredging activities are completed. Sand will settle very rapidly, in a matter of minutes. Silts are expected to settle at approximately 1.2 meters (4 feet) per day and would be expected to settle in 1 to 3 days given the anticipated depths for the East Span Project. Very fine clay particles could remain suspended in the water column . for longer periods of time.

Physical disturbances, including the use of dredging barges, tender vessels, etc. could disturb fish, birds, and mammals, due to the noise and movement generated by the activities. It is anticipated that the disturbance will cause animals to avoid the area during dredging activities.

Habitat would be altered in the area due to physical removal of sediments, primarily from the access channels. This would affect portions of existing eelgrass beds, mudflats, and subtidal areas in the vicinity. In subtidal areas, habitat would be deepened, as necessary, to 4.3 meters (14 feet). In nearshore intertidal mudflat areas, a channel would be created, changing the habitat type from intertidal to shallow subtidal habitat, and probably resulting in the removal of eelgrass. This would occur under the "upper limit" dredging option, if no trestles, falsework, or fill are used nearshore.

Sediments along the proposed alignment are being tested to determine chemical constituents and toxicity. Most sediments tested for the SFOBB Retrofit Project, which may be indicative of the sediment conditions for the replacement alternatives, were relatively clean and considered Suitable for Unconfined Aquatic Disposal (SUAD) (see Section 3.7).

Plankton. As discussed above, increased turbidity can result in decreased light penetration. This can in turn reduce phytoplankton productivity. This is not expected to be a common occurrence during East Span Project dredging. Most plankton productivity occurs in near surface waters, and studies for the Port of Oakland have shown that the most concentrated portion of the turbidity plume would be near the bottom. The plume is expected to settle rapidly following activities in a given area. Phytoplankton also mature very rapidly, and blooms of new plankton communities could occur every few days (Port of Oakland 1998).

Though results of the sediment testing are not yet available, toxic metals and organic compounds could be released into the water column. If this occurs, exposure to the plankton community is expected to be limited, since most chemicals would be attached to sediment particles and the turbidity plume is expected to be most concentrated near the bottom. Much of the sediment tested for the retrofit of the existing East Span did not exhibit toxicity.

Benthos. Impacts to benthic (bottom dwelling) organisms include the removal of existing benthic organisms in areas to be dredged, increased turbidity, potential burial of organisms in areas adjacent to the dredged area, and potential release of toxic chemicals associated with the sediments.

Material to be removed for construction and dismantling access channels is expected to be Young Bay Mud (see Section 2) since these channels are relatively shallow (3.6 to 4.3 meters or 12 to 14 feet deep). These areas are expected to recolonize rapidly. If dredging for access channels exposes the Merritt Sand layer, recolonization would likely not begin until silty sediments settle over the exposed sands. Disturbance of the benthic community is not considered to be significant given the extent of existing shallow soft-bottom habitat in the area, relative to the area to be deepened for access channels. Since the access channels are temporary features, they will not continue to be dredged and disturbed after bridge construction is complete.

Fish. Increased turbidity levels may adversely affect dissolved oxygen levels in the water and oxygen uptake by fish in the immediate vicinity of the plume due to clogged or lacerated gills. Studies cited by the Port of Oakland indicated that juvenile Chinook salmon *(Oncorhynchus tshawytscha)* showed damage to the gill tissues after exposure to suspended solids concentrations of 1,547 mg/L for 96 hours. Because fish tend to avoid areas of high turbidity and return to them when concentrations of solids are lower, impacts are expected to be minimal.

Increased turbidity and sedimentation could adversely affect Pacific herring (*Clupea harengus*), a commercially important species which spawns in the Bay. The herring attach their eggs to eelgrass which exists in the area. If dredging occurs during spawning season (December through February) eggs attached to the eelgrass could be impacted. The use of silt curtains while dredging will reduce the impacts on eelgrass adjacent to the dredging area.

Underwater noise generated by dredging activities may also drive fish from the immediate vicinity. It is expected that fish would return when activity ceases.

Birds. A number of bird species inhabit the area and were described fully in the EIS and the Natural Environment Study. Increased turbidity and disturbances from dredging equipment during dredging activities could reduce foraging success of these birds in the immediate area. An increase in turbidity can reduce foraging success by reducing visibility of prey (e.g., fish) in the area of the plume. Since birds are highly mobile and forage over large areas, a temporary

decrease in visibility on a localized area is not expected to have great impacts considering the total foraging area for the birds. It is also expected that fish will also avoid the immediate vicinity of the plume and it is likely that the birds would follow the prey to nearby areas.

Special Status Species. Special status species described in the EIS include the American peregrine falcon (*Falco peregrinus anatum*), double-crested cormorant (*Phalacrocorax auritus*), Chinook salmon (winter, fall and spring-run), steelhead (*Oncorhynchus mykiss*), green sturgeon (*Acipenser medirostris*), longfin smelt (*Spirinchus thaleichthys*), Pacific herring, harbor seal (*Phoca vitulina*), and California sea lion (*Zalophus californicus*).

Impacts to peregrine falcon and double-crested cormorant are primarily related to the construction and dismantling of the bridge itself. Dredging activities are not expected to seriously impact these species.

Chinook salmon, steelhead, green sturgeon, and longfin smelt may occur in the area. Localized increases in turbidity might reduce foraging success and other impacts described above for all fish. These species are expected to avoid the turbidity plume, and migration to and from spawning areas in the Bay/Delta region would not be affected. As described above, Pacific herring could be affected by increased turbidity due to sedimentation of eelgrass beds which the herring use for spawning.

Marine mammals such as the harbor seal and California sea lion may occasionally forage in the area; however, they range widely and would be expected to avoid the turbidity plume and activities during dredging operations.

Special Aquatic Sites. Special aquatic sites in the project area that would be affected by dredging include eelgrass beds and mudflats. Impacts to special aquatic sites as a result of dredging would only occur under the "upper limit" dredging scenario for Alternatives N-2 and N-6. Dredging would not occur in special aquatic sites under the "lower limit" dredging scenarios, however impacts to special aquatic sites could still occur due to construction of trestles, falsework, and/or fill.

Eelgrass (*Zostera marina*) beds are known to occur in shallow waters, less than 2 meters deep (6.56 feet), within the project study area. Eelgrass beds were observed on the north side of the Oakland Touchdown extending to depths ranging from about 1 to 1.5 meters (3.5 to 5.0 feet) (See Figures 3-2 through 3-4). Eelgrass beds in this area are patchy, occurring within 3 to 5 meters (10 to 15 feet) of each other. Individual patches of eelgrass vary from 1.5 to 4 meters (5 to 12 feet) in diameter. The eelgrass bed near the shore of the Oakland Touchdown appears to be young which suggests that the bed may be increasing in size and density. Eelgrass beds are highly productive habitats for numerous species of fish including Pacific herring which use eelgrass as spawning habitat.

Dredging for the construction of the access channel ("upper limit" dredging scenario) for Replacement Alternatives N-2 and N-6 may result in the loss of 0.57 hectare (1.4 acres) of eelgrass beds near the Oakland Touchdown (Figures 3-2 and 3-3). Under the "lower limit" dredging scenario, no eelgrass beds would be lost due to dredging, however, use of trestles, falsework, or fill in the nearshore area would result in the loss of 0.32 hectares (0.8 acres) of eelgrass beds. As noted above, eelgrass in this area is not dense so these numbers do not necessarily indicate the amount of eelgrass lost due to dredging or trestle construction.

The Southern Replacement Alternative (S-4) would result in the loss of 0.18 hectare (0.46 acre) of eelgrass near Yerba Buena Island. Eelgrass disturbance on the S-4 Alternative would result from construction of trestles, but not dredging per se. No eelgrass would be affected by the S-4 Alternative on the Oakland Touchdown due to dredging or trestle construction (Figure 3-4).

Eelgrass in the immediate vicinity of dredging operations that is not physically removed may be adversely affected by turbidity and sedimentation. Physical controls such as silt curtains may be used to control sedimentation in adjacent areas. Mitigation measures for losses of eelgrass are proposed and described in the following section entitled "Mitigation Cited in the EIS".

Mudflats that may be impacted by dredging occur along the north side of the Oakland Touchdown (see Figures 3-2 through 3-4). Mudflats also occur along the southeast side of Yerba Buena Island although these would not be affected by dredging. Mudflats provide valuable feeding, bathing, and roosting habitat for a variety of shorebirds.

Replacement Alternatives N-2 and N-6 would result in the removal of 2.3 hectares (5.7 acres) of mudflat near the Oakland Touchdown due to dredging for the construction access channel (Figures 3-2, 3-3). It should be noted that eelgrass also occurs in the intertidal mudfalt area, thus the total area of these habitat types is "double-counted" in the estimates in this section. Under the "lower limit" dredging scenario, trestles, falsework, or fill would cover 0.55 hectares (1.4 acres) of mudflat. This mudflat would be restored after construction is complete and the temporary fill or trestles are removed.

Replacement Alternative S-4 would not affect mudflats due to dredging. Approximately 0.07 hectare (0.18 acre) of mudflat habitat would be affected near Yerba Buena Island due to placement of construction trestles.

Mitigation Cited in the EIS

Several mitigation measures have been proposed to reduce or avoid impacts to biological resources related to dredging operations. These include:

Chinook salmon, steelhead, green sturgeon, longfin smelt. Mitigation would include: the use of physical barriers such as silt curtains, if practicable, to contain the turbidity plume as much as possible; selection of dredging equipment to reduce suspended materials; and, if construction sequencing permits, dredging in shallow water would be restricted to a window between June 1 and November 30.

Pacific herring. Construction activities occurring during the seasonal spawning period will be monitored by a qualified biologist (approved by CDPG) to watch for the presence of herring. If spawning is observed in the project area, in-water activities such as dredging, will be suspended within 200 meters (656 feet) of observed spawning. Dredging would not resume in that area for a period of up to 14 days (as determined by the qualified biologist), allowing herring eggs to hatch and the larvae to disperse. This avoidance measure has been suggested by CDFG (personal communication, Becky Ota, CDFG) and is commonly used for projects that may affect Pacific herring.

Eelgrass Beds. Conceptual plans for eelgrass mitigation include engineering a site for optimal eelgrass success and transplanting eelgrass to the prepared site. Creation of eelgrass beds is considered experimental and depends on several variables including: balance of sedimentation and scour, compression and settling of the sediment fill and underlying material, contamination, and the transplanting protocol. A pilot program is currently being conducted by Merkel and Associates for the Port of Oakland. The results of this program should provide insight into preparing a mitigation site for the SFOBB project. Mitigation is proposed at a 3:1 ratio and will include mitigation for dredging impacts discussed in this DMMP as well as other project impacts not related to dredging.

Use of physical barriers such as silt curtains will reduce the impacts of sedimentation on adjacent eelgrass beds during dredging of the access channel. Sediment removal for the construction of bridge piers in shallow water will take place within cofferdams, minimizing turbidity in the water column.

Intertidal Mudflats. Potential mitigation sites that would provide opportunity to restore intertidal mudflats are being reviewed. As for eelgrass beds, a mitigation ratio of 3:1 is proposed for mudflat restoration.

Mitigation for the entire project will be discussed in the FEIS (Sections 4.9.2 and 4.14.8). A separate, detailed Mitigation and Monitoring Plan will also be prepared for the project. This will include mitigation for dredging impacts, as well as other project impacts such as permanent loss of habitat due to bridge pier, and other structures, both in the water and on land.

Water Quality

Water quality parameters that could be affected by dredging activities include, but are not limited to suspended solids concentrations, dissolved oxygen, salinity, pH, and concentrations of metals and organic compounds. Most of the impacts described here would result from dredging of the access channels. Sediment removal for bridge piers would occur within coffer dams and is not expected to affect water quality.

Suspended Solids. As described above under biological effects, elevated total suspended solids (TSS) concentrations can reduce light transmittance in the water column, dissolved oxygen levels, and potentially release toxic metals and organic compounds that may be associated with the sediments being dredged. The concentration of suspended material varies with the type of dredging equipment used and the materials being dredged. In general, clamshell buckets create the highest level of suspended material and turbidity while cutterhead dredging creates the least. Studies by the Port of Oakland have shown that the concentrated portion of the plume would be near the bottom and that most of the plume would dissipate quickly. Sediment concentrations, measured by the COE and reported by the Port of Oakland, were generally less than 200 mg/L and averaged 30 to 90 mg/L in the upper water column 50 meters (164 feet) downstream from clamshell dredging operations. Higher concentrations extended about 450 meters (1,476 feet) near the bottom. Background considerations measured near Yerba Buena Island by the Regional Monitoring Program (RMP) were less than 10 mg/L.

The Port of Oakland estimated through modeling efforts that TSS concentrations would not exceed 1,500 mg/L at a distance of 8 meters (26.3 feet) from the dredging activity. As noted

above, juvenile Chinook salmon have been shown to be adversely affected by concentrations slightly higher than 1,500 mg/L after 96 hours of exposure. It is likely that the fish could withstand higher concentrations for shorter periods of time without adverse effects.

Dissolved Oxygen. Dissolved oxygen concentrations are expected to decline in the immediate vicinity of dredging operations because the resuspension of oxygen poor (anoxic) sediments would create an oxygen demand in the water column. COE studies have shown that depressions in dissolved oxygen concentrations were greatest in the lower 2 meters (6.5 feet) of the water column and background levels were regained within approximately 10 minutes. Decreases in dissolved oxygen concentrations are expected to be localized and of short duration.

Salinity, pH, and Nutrients. COE studies have shown that dredging operations rarely have an effect on salinity and pH. Slight changes in these parameters were noted only 25 percent of the time during monitoring studies.

Nutrient enrichment in the water column can occur when nutrients (phosphorus, nitrogen, silica) in the sediments are released to the water column through the dredging operations. This can cause a slight increase in turbidity in some cases by enhancing primary productivity. Nutrient enrichment and associated effects would be minimal due to the expected rapid dilution and tidal exchange in the project area.

Metals and Organic Compounds. Dredging of sediments can resuspend metals and organic compounds associated with the sediment particles. Though results of the sediment tests for the proposed Replacement Alternatives are not yet available, sediments collected and tested near the existing bridge were largely clean and suitable for unconfined aquatic disposal (see Section 3.7). Any material found to be contaminated and not suitable for aquatic disposal will require careful removal.

Several studies of metals released during dredging operations have been conducted in various parts of the U.S. and were reported in the Port of Oakland 50-Foot Dredging Project EIS. Though the sites reported had metal enriched sediments, San Francisco Bay water quality objectives were generally not exceeded. Modeling conducted for the Port of Oakland indicated that metals and organic compounds would not generally exceed water quality objectives for the protection of aquatic life.

Mitigation

Mitigation measures for biological resources, such as the use of silt curtains, are primarily designed to protect water quality which in turn would protect aquatic life.

The range of reuse and disposal options considered for dredged material include:

- In-Bay, ocean disposal, and Upland/Wetland Reuse (UWR)
- Upland landfill disposal or reuse as fill material for construction projects
- Sidecasting adjacent to the dredging site

The range of options considered for in-Bay, ocean disposal, and UWR is presented in Section 4.1. The range of options considered for upland reuse/disposal is presented in Section 4.2. The sidecasting option is presented in Section 4.3.

4.1 IN-BAY, OCEAN DISPOSAL, AND UPLAND/WETLAND REUSE

A wide range of reuse/disposal sites within the nine county region was considered. This initial range of sites includes sites listed as part of the Dredging and Disposal Road Map (BCDC and LTMS 1998). The Road Map is a compilation of existing and planned sites identified by the BCDC and the COE that can potentially accomodate current and potential dredged Bay materials. In addition to the Road Map, other persons knowledgeable of potential disposal sites were consulted to identify potential locations, and the Regional Dredged Rehandling Facility Feasibility Study (Port of Oakland 1999), recently prepared for the Port of Oakland was reviewed. Treasure Island was also considered as a potential reuse/disposal site due to its proximity to the East Span project area.

Due to the large number of initial alternatives, screening criteria were applied to focus further analysis only upon those that are "practicable options." The selection of practicable alternatives is the first step in the sequential analytical process that is at the core of Section 404(b)(1) permit decisions. The term practicable is defined in Section 404(b)(1) guidelines to mean "available and capable of being done after taking into account considerations of cost, existing technology, and logistics of overall project purposes."

Table 4-1 summarizes the status of each of the sites considered. The sites range from operating upland landfills that accept project dredge materials for daily cover over refuse to former tidal marsh sites that have been diked. Sites were determined to be potential reuse/disposal sites for the East Span Project if the following conditions were met:

- In-Bay or deep ocean sites must be designated and available to accept SUAD material in quantities equal to those to be generated by the East Span Project;
- Planned dredge material reuse sites developed by other public agencies or private entities (e.g., Hamilton or Montezuma Wetlands Restoration sites) would need to be permitted and in place by 2000;
- Sites for restoration of tidal marsh habitat (e.g., Alameda Naval Air Station, Black Point) using dredge material from the East Span Project must have undergone environmental review and regulatory agency permitting and approval (by the permittee or others) by the time construction begins in 2000;
- Upland landfill sites (e.g., Altamont Landfill) would need to be online and available to accept the quantities generated on a month-by-month basis;

Table 4-1

Potential Reuse/Disposal and Rehandling Sites

Reuse/disposal Site	Excluded	Comments
In-Bay		
Alcatraz (SF-11)[1]		Site presents seasonal volume constraints; new bridge material may not be accepted under the maintenance definition. *Identified for further evaluation for SUAD material.*
Carquinez Strait (SF-9)		Site has volume limits and seasonal restrictions on disposal capacity, but could accept SUAD material.
San Pablo Bay (SF-10)		Site has volume limits and seasonal restrictions on disposal capacity, but could accept SUAD material.
Suisun Bay (SF-16)	X	Site is used exclusively for Suisun Bay Channel material disposal.
Bay Farm Island		Site does not currently exist and has low feasibility of being built.
Middle Harbor Enhancement Areas	X	Site will be constructed as part of 50' project for placement of Port of Oakland material; site priority is for Port of Oakland materials. No need for sediments from other projects.
Ocean		
S.F. Bar Channel	X	Site is used exclusively for Bar Channel material placement.
S.F. DODS[1]		Site is designated (Marine Protection, Research, and Sanctuaries Act Section 102 permit); sufficient volume for SUAD material under EPA rulemaking limit. *Identified for further evaluation.*
Reuse/Non Tidal		
Airport Borrow Pits, Solano		Site does not currently exist as a UWR site; would accept NUAD (material not suitable for unconfined aquatic disposal) for rehandling.
Alameda Naval Air Station, Alameda		Site has feasibility study for golf course underway; it has been proposed for the Port's 50' project use and has a priority for that project. Environmental documentation and project planning underway but not complete.

[1] These sites represent typical UWR sites. Other sites on this table that are not evaluated in detail may have somewhat different environmental concerns.

Table 4-1

Potential Reuse/Disposal and Rehandling Sites

Reuse/disposal Site	Excluded	Comments
Blackpoint, Marin County		Site does not currently exist as a UWR but has potential to be restored. Property is owned by State Lands Commission. Would require environmental review, permitting, and wetland design. Environmental issues at this site include historic structures, endangered species, and seasonal wetlands.
Bel Marin Keys, Marin		Site does not yet exist for reuse/disposal; it may be incorporated into Hamilton restoration project. Would require environmental review, permitting, and wetland design.
Cargill Salt Evaporator Ponds, Solano and Napa		Site does not currently exist for reuse/disposal; opposition from owner makes construction unlikely.
Cargill Salt Crystallizer Ponds, Solano and Napa		Site does not currently exist as a UWR site; would require land acquisition, environmental review, permitting, and wetland design.
Cullinan Ranch, Napa and Solano	X	Site does not exist for reuse/disposal; restoration concepts call for tidal marsh restoration using natural processes. Dredged materials are not being sought.
Galbraith Golf Course, Alameda	X	Site capacity has been utilized by Port of Oakland 42' project. No additional capacity.
Hamilton Airfield, Marin[1]		CEQA/NEPA process started March 1998. Final EIR/EIS due in Spring 1999. *Identified for further evaluation as a representative site.*
Landfills *Examples*: Redwood Altamont Vasco Road		Upland confined disposal can accept clean cover material (SUAD) as well as NUAD materials.
Leonard Ranch, Sonoma		Site does not exist as a UWR site; may face opposition from owner. Would require land acquisition, environmental review, permitting and design. Would require a 1-2 mile pipeline for offloading.

[1] These sites represent typical UWR sites. Other sites on this table that are not evaluated in detail may have somewhat different environmental concerns.

Table 4-1

Potential Reuse/Disposal and Rehandling Sites

Reuse/disposal Site	Excluded	Comments
Mare Island, Solano		Reuse plan includes confined disposal and capping.
Marin County Flood Control District		Site does not yet exist as UWR site. Would require environmental review, permitting, and wetland design.
Moffet Field, Mountain View	X	Site does not currently exist. Property owner has no plans for wetland creation. Wetland development may conflict with current and planned land use. Would require a 3-4 mile pipeline for offloading.
Montezuma, Solano[1]		Site's Final EIR/EIS was issued in July 1998. Site is planning to accept both SUAD and NUAD (non-wetland cover) material. *Identified for further evaluation as a representative site for UWR.*
Napa River, Napa	X	Site is used exclusively for federal channel material disposal.
North Point Property, Sonoma		Site does not currently exist as a UWR site but has potential to be restored. Would require environmental review, permitting and wetland design. Would require a pipeline for offloading.
Petaluma Drying Ponds, Sonoma	X	Site is used exclusively for federal channel material disposal.
Pierce Island, Solano	X	Site is used exclusively for federal channel material disposal.
Port of Oakland Berth 10, Alameda		Site's rehandling facility may be available; RWQCB permits are needed. Not a reuse/disposal site.
Port of Richmond Shipyard No.3, Contra Costa		Site's rehandling facility may be available; RWQCB permits are needed. Not a reuse/disposal site.
Port of S.F. Pier 94, San Francisco	X	Site does not currently exist; local community opposition is expected. Possible future use as a regional rehandling facility, but not a UWR site.
Port Sonoma Drying Ponds, Sonoma	X	Site is used for marina materials only.

[1] These sites represent typical UWR sites. Other sites on this table that are not evaluated in detail may have somewhat different environmental concerns.

Table 4-1

Potential Reuse/Disposal and Rehandling Sites

Reuse/disposal Site	Excluded	Comments
Port Sonoma- Hwy 37, Sonoma	X	Site is used for Port Sonoma materials only.
Praxis-Pacheco, Contra Costa		Site does not exist as a reuse/disposal site; it has been proposed for commercial development. Site development could affect existing wetlands and endangered species. Would require environmental review, permitting, and wetland design.
San Leandro, Alameda	X	Site is used exclusively for federal channel materials.
Sherman Island Scour Pond, Sacramento		Site does not exist; salinity impacts are a concern. Would require permitting, environmental review, and rehandling of material to reduce salinity.
Skaggs Island, Sonoma	X	Site's reuse plan does not contemplate disposal.
Sonoma Baylands, Sonoma	X	Site's capacity has been reached with Port of Oakland 42' project.
Treasure Island, San Francisco		Site's landfill at site 11 is undergoing remediation. No current plans that would use dredged materials.
White Slough Project, Route 29/37 Interchange, Solano County		Material could be used as fill for roadway construction. Use at this site would depend on geotechnical suitability of the dredged material, coordination of construction schedules of the East Span Project and White Slough Project, and costs.
Winter Island, Contra Costa	X	Site is used exclusively for federal channel material disposal. Salinity of the Bay sediment is an issues in freshwater areas due to potential degradation of water quality.

Source: BCDC and LTMS 1998; Tetra Tech EMI, January 1999; Port of Oakland 1999; URSGWC 1999, direct contact with facility management.

[1] These sites represent typical UWR sites. Other sites on this table that are not evaluated in detail may have somewhat different environmental concerns.

- Upland construction projects (e.g., Caltrans roadway projects or private development sites) would need to be identified and have material drying and/or storage sites.

In regard to upland construction projects, Caltrans has identified one highway project that may be able to use the dredged material as fill. This project involves improvements to the Highway 29/37 interchange in Solano County at White Slough near the Napa River. The project will need approximately 765,000 m^3 (1 million cy) of fill material for the roadbed and embankments. Use of the material at this site will be contingent upon several factors. The project is expected to start approximately one year after the start of the East Span dredging activities, thus material would need to be stockpiled in the interim. Costs of drying, trucking, and storage of the material will also need to be considered. Most importantly though, the material must be suitable as structural roadway fill. Merritt Sand can sometimes be used for roadbeds; however, this material is not suitable for construction of embankments. The material must also be compactable to within 90 percent of its original volume to be suitable for use in construction projects. The specific geotechnical characteristics of the sediments to be dredged are not known at this time and the potential use of this material for this project cannot be determined until geotechnical testing of the material has been conducted.

There are no other Caltrans projects in Western Contra Costa County or Northwestern Alameda County that need fill materials. However, at least three other projects will be generating large amounts of upland fill that may be more suitable for use on the Highway 29/37 interchange project.

Sites Evaluated in the DMMP

Based on the initial screening criteria, 16 sites cannot be considered practicable options and are excluded from further evaluation. Some of the excluded sites do not accept material other than from specific projects (e.g., Federal dredging projects): other sites are only available for temporary use as a rehandling location, but not for permanent reuse/disposal. At some excluded sites the use of sediments would be contrary to current land use plans.

In addition to landfills, 23 of the identified sites can potentially accept East Span Project dredge material and are retained for future consideration. Four sites among them have been selected as representative for the purpose of the DMMP. The four sites are currently available or are expected to be available for disposal of East Span Project dredge material to meet the project schedule and best meet the screening criteria presented above. The remaining 19 sites are not currently available and may not be available within the timeframe of the project since permitting, environmental studies, or infrastructure requirements are lacking, or their use faces public or owner opposition. Those sites may necessitate longer time to develop than allowed by the project schedule to become viable options. However, they are not excluded from future consideration.

The sites further assessed in the DMMP are:

- Alcatraz (SF-11)
- San Francisco Deep Ocean Disposal Site (SF-DODS)
- Hamilton Wetlands Restoration

- Montezuma Wetlands Restoration

Two upland/wetland reuse sites were carried forward for detailed analysis. The two sites selected to represent this reuse approach, Hamilton and Montezuma, were selected because environmental documents have been prepared for the projects. Information from the environmental documents has been used to characterize the potential effects of reuse of East Span Project dredge materials for tidal wetlands recreation. The types of benefits and impacts that would result from use of these sites is representative of the other potential upland/wetland reuse sites listed in Table 4-1.

Figure 4-1 shows the location of in-Bay, ocean, and UWR disposal sites selected for further analysis among the range of sites presented in Section 4.1. Figure 4-1 also shows the location of landfill sites presented in Section 4.2. The following subsections summarize the affected environment at each of the sites. Section 5.0 presents the impacts, cost, and technical feasibility associated with the sites, consistent with 404 (b)(1) criteria.

4.1.1 Alcatraz (SF-11)

The Alcatraz disposal site (SF-11) is located approximately 0.5 kilometer (0.3 mile) south of Alcatraz Island in central San Francisco Bay (Central Bay) and approximately 8 kilometers (5 miles) from the East Span Project site. The site is a circular area, approximately 610 meters (2,000 feet) in diameter. The site was formally designated as a sediment disposal site in 1972, although dredged material has been deposited there since 1894. Because of frequent disposal at this site a mound developed in the 1980s which posed a potential threat to navigation in the area. The site is actively managed by the COE to maintain it at navigable depths. It currently has an annual limit of 3,058,104 m^3, or 4 million cubic yards (mcy), with a monthly restriction of 305,810 m^3 (400,000 cy) from October to April, and 299,357 m^3 (300,000 cy) from May to September (LTMS 1998). Its availability is discussed in Section 5.1.

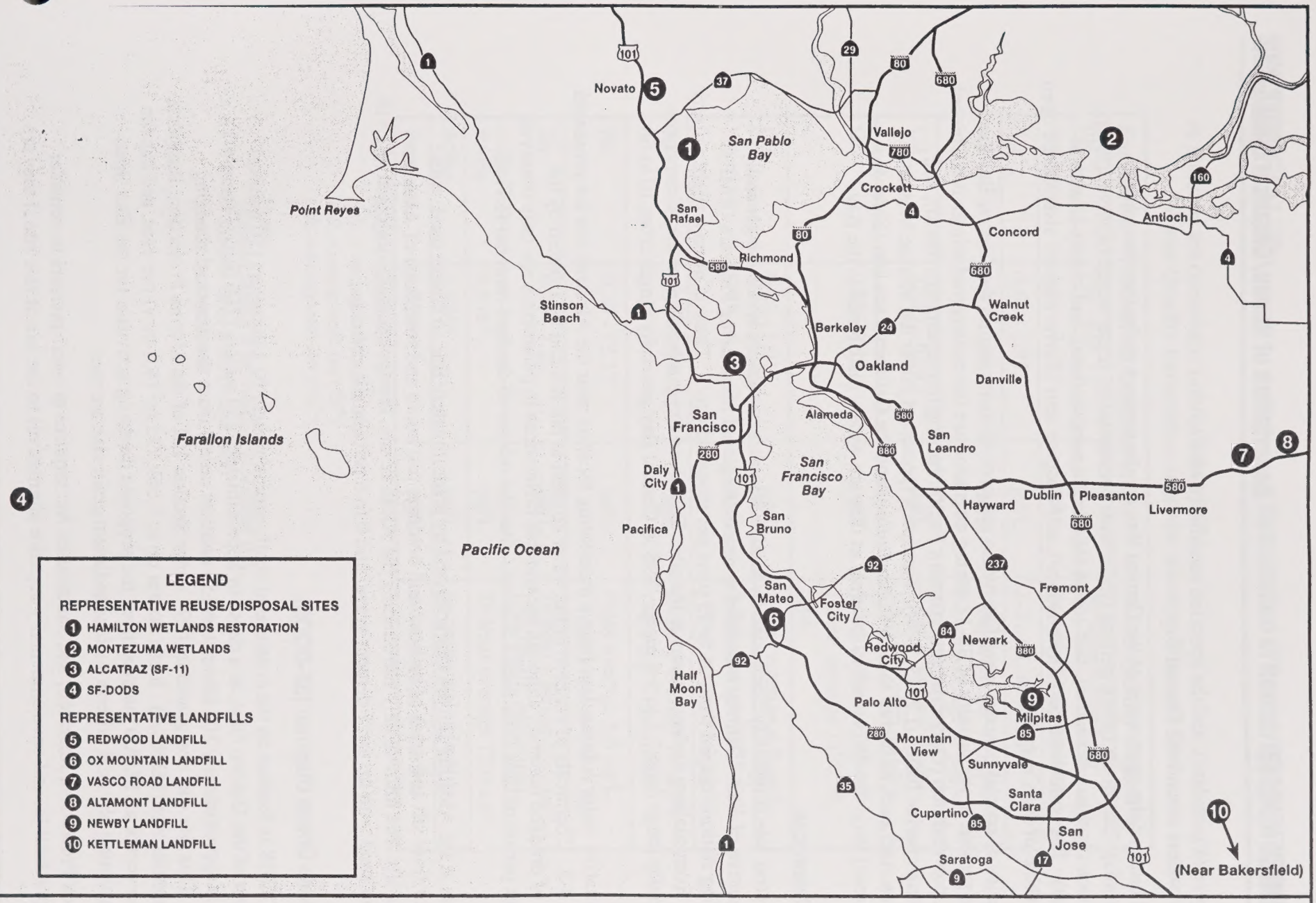
Biological Resources

Phytoplankton and zooplankton populations in the Central Bay are largely dominated by influxes from ocean and South Bay waters. Ghost shrimp and oceanic species of krill can be found in this portion of the Bay.

Benthic (bottom dwelling) organisms that live in the deeper parts of the Central Bay are typical of those found in sandy sediments along the outer coast (COE et al. 1998). Common species include the polychaetes *Armandia brevis, Mediomastus* sp., *Siphones missionensis,* and *Glycinde picta,* the amphipod *Foxiphalus obtusidens* and the crab *Cancer magister.* All of these are native species. There are also a number of benthic species that have been introduced to the Bay such as *Potamocarbula amurensis.*

Fish commonly found in the Central Bay include the northern anchovy (*Engraulis mordax*), Pacific halibut (*Hippoglossus stenolepis*), striped bass (*Roccus saxatilis*), American shad (*Alosa sapidissima*), Chinook salmon, white croaker (*Genyonemus lineatus*), Staghorn sculpin (*Leptocottus armatus*), and shiner surfperch (*Cymatogaster aggregata*). Within the Estuary, the English sole (*Parophrys vetulus*) is found most abundantly in the Central Bay. Except for striped bass, all of the species commonly found in the Central Bay are native. Shiner surfperch,

jacksmelt jacksmelt *(Atherinopsis californiensis)*, topsmelt (*Atherinops affinis)*, diamond turbot



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Reuse/Disposal Sites

Figure 4-1

PDQ&D 6/14/99

(*Hypsopsetta guttulata*), and the speckled sanddab (*Citharichthys stigmaeus*) are common in shallow waters around the Central Bay.

Typical birds of the open water of the Central Bay are the western grebe (*Aechmophorus occidentalis*), California brown pelican (*Pelecanus occidentalis*), lesser scaup (*Aythya affinis*), canvasback (*Aythya valisineria*), surf scoter (*Melanitta perspicillata*), and osprey (*Pandion haliaetus*). The common loon (*Gavia immer*), and Caspian tern (*Sterna caspia*) also use the open water habitat of the Central Bay.

The species of special concern identified by the resource agencies within the Central Bay that could be present in the vicinity of SF-11 during migration are the endangered winter-run Chinook salmon, coho salmon (*Oncorhynchus kisutch*), Pacific herring (commercially fished), and recreational marine fishes (LTMS 1998). Pinnipeds (protected under the Marine Mammal Protection Act) such as harbor seals (*Phoca vitulina*) and the California sea lion (*Zalophus californicus*) may also be present in the area, as they are widely distributed in the Bay.

Water Resources

The Alcatraz site is typically dominated by marine waters, and salinity levels are generally representative of such. Salinity measured at nearby Regional Monitoring Program (RMP) monitoring stations ranged from 24 to 33 parts per thousand (ppt). There is often a slight salinity gradient from shallow to deep waters at the site. Dissolved oxygen levels near the Alcatraz site are generally range from 7.1 to 9.6 mg/L. TSS in Central Bay generally ranges from 10 to 60 mg/L.

Representative water column data from a monitoring location near the Alcatraz site are presented in Table 4-2. Chemicals of concern in the water column at the site can be affected by the disposal of dredged material, although measurable differences in parameters are only observed for a short period of time (less than 1.5 hours) after the release of dredged material (LTMS 1998).

Sediments at the Alcatraz site are characterized by predominately fine to coarse sand, with pockets of finer silt and areas of bedrock and boulders just south and southwest of Alcatraz Island. In the area immediately surrounding the Alcatraz site, the sediment is comprised of 18 to 98 percent sand with up to 17 percent gravel and 0 to 6 percent silt and clay.

4.1.2 Deep Ocean Disposal (SF-DODS)

The SF-DODS is located on the continental shelf, approximately 91 kilometers (50 nautical miles) west of the Golden Gate, at a depth of approximately 230 meters (760 feet) (Figure 4-1). This site is approximately 102 kilometers (55 nautical miles) from the proposed dredging location. This site was designated in 1994 under Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA). It can accept up to 3,669,725 m^3 (4.8 mcy) per year, and has the capacity to accept all SUAD material from the proposed dredging activities for the East Span Project assuming physical criteria such as sediment grain size are met.

The Marine Protection, Research, and Sanctuaries Act requires project sponsors to consider feasible, practicable, and environmentally superior alternatives to the use of this site if they are available.

Table 4-2
Water Quality Parameters near the Alcatraz Disposal Site

Parameter	Dissolved Concentrations		Water Quality Objective
pH	7.8 - 8.0		between 6.5 and 8.5
ammonia	1.84 - 2.10	µM	no numerical objective
Ag	0.68 - 1.95	µg/L	2-3 µg/L maximum
As	1.57 - 2.08	µg/L	4-day average 9.3 µg/L 1-hour average 69 µg/L
Cd	33.63 - 63.85	µg/L	4-day average 9.3 µg/L 1-hour average 43 µg/L
Cr	0.09 - 0.13	µg/L	4-day average 50.0 µg/L, 1-hour avearge 1100.00 µg/L
Cu	0.87 - 1.91	µg/L	1-hour average 4.9 µg/L
Hg	0.79 - 1.64	ng/L	4-day average 0.025 µg/L 1-hour average 2.1 µg/L
Ni	0.84 - 1.99	µg/L	24-hour average 7.1 µg/L 140.0 µg/L maximum
Pb	9.50 - 13.17	ng/L	4-day average 5.6 µg/L, 1-hour average 140.0 µg/L
Zn	0.49 - 1.22	µg/L	24-hour average 58.0 µg/L 170.0 mg/L maximum
PAHs	2,926*	pg/L	24-hour average 15.0 µg/L
PCBs	2,886*	pg/L	no numerical objective
Pesticides	1,722*	pg/L	no numerical objective

µg/M = micromoles (10^{-6})
µg/L = micrograms/Liter (10^{-6})
ng/L = nanograms/Liter (10^{-9})
pg/L = picograms/Liter (10^{-12})

Notes:
Sampling Station at the mouth of Richardson Bay.
* Samples taken at the Golden Gate.
Source: (LTMS 1998).

Biological Resources

Detailed surveys of the plankton community at the ocean disposal site have not been performed, although information about plankton communities expected within the study area were inferred from various studies performed along the central California coast and Gulf of the Farallones and reported by the Port of Oakland (1998).

Phytoplankton expected to be present within the ocean disposal area include various diatoms, coccolithophores, dinoflagellates, and silicoflagellates. Species that have been observed during upwelling events include the diatoms *Chaetoceros* sp. and *Rhizosolenia* sp. Dinoflagellates such as *Ceratium* sp. and *Peridinium* sp. are predominant during non-upwelling periods. Abundances and productivity are expected to be lower in the vicinity of the ocean disposal area, which is located in deep waters along the continental slope and rise, than in shallower nearshore waters.

Zooplankton serve as an important food source for various organisms including other zooplankton, squid, fish, seabirds, and marine mammals. Commonly occurring species include various copepods (e.g., *Calanus* sp., *Neocalanus* sp., *Eucalanus* sp., and *Acartia* sp.), arrow worms chaetognaths (such as *Sagitta* sp.), and salps (Thaliaceans such as *Thalia democratica* and *Doliolum denticulatum*). Pelagic mollusks likely to be present include the gastropods *Limacina helicina, Clio pyramidata,* and *Corolla spectabilis*.

Surveys of benthic (bottom dwelling) organisms were conducted in 1990 and 1991 in the vicinity of the SF-DODS for the EPA's LTMS program Ocean Studies Plan for dredging and disposal and are summarized in the Port of Oakland's 50-Foot Project EIS. The study area incorporated the SF-DODS. A total of 385 faunal species were collected, consisting of 48 percent polychaetes, 32 percent crustaceans, 8 percent mollusks, and 12 percent miscellaneous taxa. The taxa tended to be typical of deep-sea infaunal communities. Densities range from 4,970 to 9,870 individuals/m^2 in 1990, and from 750 to 7,540 individuals/m^2 in the 1991 survey. Species diversities were also higher in 1990 than in 1991. This study area tended to have lower infaunal densities than shallower areas surveyed. This is consistent with trends of decreasing density with depth in continental slope environments.

Fish trawl surveys were conducted by the U.S. Navy in 1991 and 1992. Fish densities were low in 1991 (e.g., 207 individuals/ha), and the dominant demersal (bottom dwelling) species were rattails, eelopouts, and morids such as finescale codling (*Antimora microlepis*). Pinniped species observed within the study area included the California sea lion, northern elephant seal (*Mirounga angustirostris*), Steller's sea lion (*Eumetopias jubatus*), and northern fur seal (*Callorhinus ursinus*). The California seal lion and northern fur seal are primarily within the study area during migration and while foraging. The other pinnipeds observed (harbor seal, elephant seal, and Steller's sea lion) breed in the central California coast region.

Several surveys of bird populations have been conducted by various groups off the California coast and in the general vicinity of SF-DODS between 1985 and 1991. The survey results were summarized in Port of Oakland (1998). The species reported include both migratory species and those that are present year round. Because the study site is located near the Farallon Islands, many species that use the islands as a breeding site may be found foraging near or within the study site year-round. Species which breed on the Farallon Islands and may commonly be seen within the vicinity of the study site year round include Cassin's auklet (*Ptychoramphus*

aleuticus), rhinocerous auklet (*Cerorhinca monocerata*), and ashy storm petrel (*Oceanodroma homochri*). The common murre (*Uria aalge*), which also breeds in the Farallon Islands, exhibited moderate to high densities within the study area during the spring but generally moved to shallower waters closer to shore in the summer. Commonly observed migratory species in the study area include sooty shearwaters (*Puffinus griseus*), red-necked phalarope (*Phalaropus lobatus*), and Sabine's gull (*Xema sabini*).

Special Status Species. Special status species known to occur at the San Francisco Deep Ocean Disposal Site and vicinity are listed in Table 4-3. None of these species are known to breed at this site, though several species are known to use the Farallon Islands, approximately 22 nautical miles away, for nesting and breeding activities.

Water Quality

Several studies conducted in the vicinity of SF-DODS have been summarized in the Port of Oakland 50-Foot Dredging Project EIS (Port of Oakland 1998). Results of the surveys indicate that there is a high variability in the temperature profile related to seasonal changes in association with upwelling, changes in the California current system, wind conditions, and various other current patterns within the area. Temperature profiles in July 1991 indicated a well-mixed surface layer, below which temperatures decreased rapidly (thermocline), followed by gradual changes with depth. Temperatures in the upper 100 m (328 feet) of the water column ranged from 11° C to 14° C. Temperatures dropped to 4° C at about 1,000 m (3,280 feet) and approximately 2° C at 2,000 m (6,562 feet). The profiles were typical for California coastal areas in the summer.

Dissolved oxygen profiles indicated an oxygen minimum zone (due to sinking and decomposition or grazing of organic material) at about 800 m (2,625 feet) with oxygen concentrations of 0.5 mg/L. Surface waters had oxygen levels of 8 mg/L, with a gradual decline in concentrations with depth through the mixed layer. Below the minimum zone, dissolved oxygen levels increased to greater than 3 mg/L at about 2,000 m (6,561 feet).

Measurements of pH in the Gulf of the Farallones ranged from 7.8 to 8.3 and are expected to vary with changes in carbon dioxide and oxygen levels resulting from changes in planktonic primary production (i.e., higher pH values occur where oxygen levels are high and carbon dioxide levels are low as a result of high productivity).

Salinity profiles within the study area were obtained in July 1991 from a Navy study near SF-DODS. Values ranged from 32.9 ppt in surface waters (25 meters or 82 feet) to 34.7 ppt at a depth of 390 meters (1,280 feet). As with temperature, salinity values varied seasonally, particularly in the surface layer, which had lower values in the winter and spring during periods of high river outflow.

TSS measured in the Gulf of the Farallones for regions over the continental shelf tended to be higher than slope and shelf break areas, ranging from 0.3 to 2.9 mg/L in the top 25 meters (82 feet) of the water column. Concentrations near the shelf-break ranged from 0.08 to 2.51 mg/L.

Light transmissivity measurements were made in the fall of 1991 as an indication of suspended solids and turbidity. Light transmissivity measurements made throughout the water column on the western boundary of SF-DODS were 88 to 90 percent. Similar values were found along the

Table 4-3

Special Status Species that have Potential to Occur within the Proposed San Francisco Deep Ocean Disposal Site and Vicinity

Common Name *Scientific Name*	Status	Likely Habitat Use
Winter-run Chinook salmon *Oncorhynchus tshawytscha*	FE / CE	M / F
Central California steelhead *Oncorhynchus mykiss*	FT / CSMS	M / F
Double-crested cormorant *Phalacrocorax auritus*	SSC	F / R
California brown pelican *Pelecanus occidentalis californicus*	FE / CE	F / R
American peregrine falcon *Falco peregrinus anatum*	FE / CE	F
California sea lion *Zalophus californicus californianus*	MMPA	F
Steller's sea lion *Eumetopias jubatus*	FT / MMPA	F
Humpback whale *Megaptera novaeangliae*	FE / MMPA	F / M
Blue whale *Balaenoptera musculus*	FE / MMPA	F / M
Fin whale *Balaenoptera physalus*	FE / MMPA	F / M
Sperm whale *Physeter macrocephalus*	FE / MMPA	F / M

Notes:

Status:
- CE = Listed as Endangered under the California Endangered Species Act
- CSMS = California Special Management Species
- FE = Listed as Endangered under the Federal Endangered Species Act
- FT = Listed as Threatened under the Federal Endangered Species Act
- MMPA = Protected under the Marine Mammal Protection Act
- SSC = California State Species of Special Concern

Likely Habitat Use:
- F = Foraging
- M = Migration
- R = Roosts or perches within project area

Source: Port of Oakland (1998)

shelf break, but much lower values were found over the continental shelf (transmittance levels of 10 to 80 percent) as a result of the higher concentrations of suspended solids. Light transmittance / turbidity is expected to vary seasonally in relation to seasonal changes in river outflow in San Francisco Bay, during periods of upwelling and high productivity, particularly over the continental shelf.

Limited trace metal data available in the vicinity of SF-DODS includes studies reported by Bruland (1980) and summarized by the Port of Oakland (Port of Oakland 1998). These studies were performed along the continental slope off central California. Trace metals measured include cadmium, copper, nickel, and zinc. Concentrations of these metals tended to be generally lower in surface water than deeper waters due to uptake from biological processes. Cadmium showed maximum concentration near the oxygen minimum zone, while copper, zinc and nickel increased with depth, likely due to solubilization from particulates. Other factors which influence surface concentrations of these metals include upwelling, resuspension of bottom sediments by currents, atmospheric deposition, and transport from river outflow from San Francisco Bay.

Organic compounds are likely to enter the site through various processes such as transport by San Francisco Bay outflow, atmospheric deposition, and oil spills or discharges (EPA 1993). Studies of organic chemicals were previously performed along the continental shelf and within the vicinity of the Gulf of the Farallones. Trace amounts of petroleum hydrocarbons, PCBs, diphenyldichlorethylene, chlordane, hexachlorocyclohexane, dieldrin, and toxaphene were measured with values less than 0.05 µg/L.

4.1.3 Hamilton Wetlands Restoration

The former Hamilton Army Airfield (HAAF) is located near the City of Novato in Marin County, approximately 29 km (18 miles) from the East Span Project. The site is bounded by San Pablo Bay to the east and U.S. 101 and Hamilton Base facilities to the west. Bel Marin Keys, a housing development, is located to the north. The site was historically within the tidal zone of San Pablo Bay. In the 1930s, portions of the area were diked and used as a military base and airfield until the 1970s when the base was closed. The site is currently being prepared for transfer and reuse under the Base Realignment and Closure Act of 1988. A wetlands restoration project has been proposed to restore a mix of seasonal and tidal wetlands on up to 360 hectares (900 acres) of land which were previously used as the airstrip for the base and an adjacent antenna field to the north (State Lands Commission parcel). The site is not yet ready to accept dredged material.

The State of California is the project sponsor for the Hamilton Wetlands Restoration Project and is considering use of dredged material from a variety of sources. The Hamilton restoration project is managed by the California Coastal Conservancy (Conservancy) and the San Francisco BCDC, with the close coordination of the City of Novato, which is managing the contracts for preparation of the conceptual restoration plan, and the Hamilton Restoration Group, comprised of representatives of government, business, and environmental communities.

A conceptual restoration plan for the Hamilton site has been prepared under the auspices of the Hamilton Restoration Group. The Hamilton site includes low elevation areas that were once marshland and are now protected from inundation by a series of levees and pumps. The re-establishment of tidal wetlands would require higher elevations (approximately 1.5 meters or 5

feet mean lower low water (MLLW) for inter-tidal marsh plain) than currently exist to allow growth of wetland vegetation. These higher elevations could probably be achieved by simply breaching the existing outboard levee and allowing tidal activity to deposit sediments. However, placement of clean dredged material at the site in order to raise elevations closer to the eventual marsh plain is the preferred alternative to hasten the colonization of the wetland plants and animals (Conservancy and LTMS 1998).

The placement of dredged material at the Hamilton restoration site would be achieved by pumping a slurry of dredged material across the site from barges moored in San Pablo Bay. To allow the natural formation of marsh channels and to prevent over-filling of the site, dredged material would be placed below the target elevation of the tidal marsh plain.

Dredged material would also be used to restore seasonal wetland and upland transitional habitat at the Hamilton site. This would be accomplished by placing dredged material in certain areas to raise elevations above the tidal marsh plain. Dredged material may also be used to construct perimeter levees and internal berms at the site. This would be accomplished by placing dredged material, allowing it to dewater and consolidate, and then re-positioning it with construction equipment. The Conservancy estimates that under the preferred alternative, up to 6,422,018 m^3 (8.4 mcy) of dredged material (SUAD) could be used to restore tidal wetlands at the Hamilton Airfield and the former antenna field.

Technical studies analyzing the various restoration alternatives and issues necessary to assess their feasibility are currently underway. A NEPA/CEQA analysis and a final restoration design plan for the Hamilton project are scheduled for completion prior to commencement of East Span Project dredging.

Funding for construction of the project is included in the Water Resources Development Act (WRDA) that is currently before the U.S. Congress. If WRDA is passed this year, the Coastal Conservancy believes that the project could begin accepting dredged material by about midyear 2000. If the vote on WRDA is postponed, the Hamilton project might not begin until the year 2001, and would be unavailable to accept sediments during at least the first portion of the East Span Project.

Biological Resources

This description is based on information provided in the Hamilton Wetland Restoration Plan EIR/EIS (Conservancy and LTMS 1998).

The Hamilton airfield consists of several habitat types including grasslands, coastal salt marsh, brackish marsh, seasonal wetlands, and a wetland created as mitigation. Wetlands historically covered much of the airfield. Construction of levees along San Pablo Bay and the subsequent draining of historic marshland resulted in the conversion of hundreds of acres of coastal wetland into farmland. Much of the site naturally converted to grassland following establishment of the airfield.

The grassland community that dominates the project site is characterized by weedy, non-native species that are regionally abundant on agricultural lands and disturbed sites. This ruderal habitat has lower value to wildlife due to an over-abundance of weeds that provide little cover or food resources, including yellow star-thistle (*Centaurea solstitialis*), ripgut grass (*Bromus diandrus*),

ox-tongue (*Picris echioides*), and black mustard (*Brassica nigra*). Regionally common wildlife species typical of upland grassland habitats have been observed on the site.

Reptiles observed in annual grasslands during field surveys included the gopher snake (*Pituophis melanoleucus*) and western fence lizard (*Sceloporus occidentalis*). Turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), California quail (*Callipepla californica*), ring-necked pheasant (*Phasianus colchicus*), savannah sparrow (*Passerculus sandwichensis*), and western meadowlark (*Sturnella neglecta*) were among the birds observed in the grasslands. Mammals included black-tailed jackrabbit (*Lepus californicus*), black-tailed deer (*Odocoileus hemionus*), coyote (*Canis latrans*) and raccoon (*Procyon lotor*).

Many of the salt marsh plain communities were once part of San Pablo Bay and have been altered by the construction of the levees. A 26-hectare (65-acre) strip of tidal salt marsh occurs outboard of the levee at the east end of the airfield. A small area of nontidal salt marsh, approximately 0.2 hectare (0.5 acre), occurs between the northwest end of the runway and Ammo Hill. The isolated pickleweed marsh drains westward into a saltgrass marsh and eventually into a small basin dominated by cattails.

Birds observed in the salt marsh during field surveys included the double-crested cormorant, great blue heron (*Ardea herodias*), great egret (*Casmerodius albus*), American coot (*Fulica americana*), killdeer (*Charadrius vociferus*), the California Species of Special Concern northern harrier (*Circus cyaneus*), and the federal Candidate San Pablo song sparrow (*Melospiza melodia samuelis*). Raccoons are also expected to occur in this habitat.

The Hamilton airfield site has its groundwater actively pumped and drained. Flooding is prevented by drainage ditches and pumping operations, but shallow ponding may occur briefly following storms allowing for areas of seasonal wetland. Seasonal wetlands at the Hamilton airfield include the majority of the low areas throughout the airfield. Though most of these areas are dominated by upland weeds, many of the areas are capable of supporting predominantly hydrophytic vegetation.

A drainage ditch surrounds most of the airfield between the perimeter road and the north, east, and southeast levees. The ditch varies in size, but averages approximately 1.5 meter (5 feet) deep and 8 meters (25 feet) wide. The ditch is lined with concrete for most of its length. It has been periodically cleared of sediment and vegetation. Dominant vegetation between ditch clearing episodes includes alkali bulrush (*Scirpus maritimus*), cattails (*Typha* sp.) and waterplaintain (*Alisma plantago-aquatica*).

The grassy banks and patches of cattail marsh provide cover and food for many birds and mammals. Barn swallow (*Hirundo rustica*), savannah sparrow, red-winged blackbird (*Agelaius phoeniceus*), lesser goldfinch (*Carduelis psaltria*), house finch (*Carpodacus mexicanus*), and black-tailed deer were observed in the ditch habitats during field surveys. Northern harriers have also been observed foraging along portions of the ditches.

In addition to wetlands that have naturally formed in topographic depressions, approximately 5 hectares (12.5 acres) of wetland were created at the northwestern end of the runway to mitigate for the loss of 1.7 hectares (4.1 acres) of wetland at Hamilton during a previous Army remediation effort.

Special status plants observed in the area inc lude the Soft birds-beak (*Cordylanthus mollis* var. *mollis*), North coast birds-beak, Petaluma popcornflower (*Plagiobothrys mollis* var. *vestitus*), and Marin knotweed *(Polygonum marinense)*.

Special status wildlife species that may occur in the area include the California clapper rail (*Rallus longirostris*), California black rail (*Laterallus jamaicensis*), California brown pelican, double crested cormorant, saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*), San Pablo song sparrow (*Melospiza melodia samuelis*), northern harrier, burrowing owl (*Athene cunicularia*), short eared owl (*Asio flammeus*), American peregrine falcon, and the salt marsh harvest mouse (*Reithrodontomys raviventris*) (Conservancy and LTMS 1998).

Water Quality

Hydrology and drainage. HAAF and adjacent properties to the north, west and south are low-lying, subsided diked historic baylands. Average annual precipitation in the region is from 61 to 76 centimeters (24 to 30 inches). Soils in the area typically exhibit rapid runoff rates with low groundwater infiltration rates and low erosion potential. Much of the airfield property is developed and therefore exhibits high runoff rates typically associated with urban development. The airfield area consists of depressed grassy areas and raised concrete and asphalt areas associated with taxiways and perimeter roads. Because the airfield runway area has extensive impervious surfaces of concrete and asphalt, it also may exhibit locally increased runoff rates.

Surface runoff within Hamilton is conveyed by a system of storm drains that feed into perimeter drainage ditches along the northern and southern perimeter levees. These channels drain to a series of pumps located in the northeastern corner of the Hamilton airfield adjacent to the eastern levee, and storm water runoff is discharged into San Pablo Bay by these pumps.

Off-site surface water inputs from adjacent areas include the Pacheco Creek and Arroyo San Jose watersheds to the west, Bel Marin Keys to the northwest, and the St. Vincent's and New Hamilton Partnership properties to the south. Stormwater flows from Pacheco Creek and Arroyo San Jose feed into Pacheco Pond. Pacheco Pond (also known as Ignacio Reservoir) is a freshwater wetland and flood detention basin located northwest of Hamilton airfield. It provides temporary storage of flood flows on Arroyo San Jose and Pacheco Creek and drains through tide gates to Novato Creek at low tide. A portion of the properties drain to the south as well as a portion of the Bel Marin Keys property to the north also drain into the Hamilton drainage and pump system. The Hamilton Airfield lies within the 100-year floodplain.

Salinity at the Hamilton site is a mix of surface runoff during rainstorms and shallow groundwater seepage. The salinity varies from fresh to brackish, depending on rainfall and evaporation. Salinity in San Pablo Bay is typically 32 parts per thousand, with lower levels during periods of high runoff.

Urban runoff from the airfield area and adjacent parcels to the west is collected by a series of storm sewers and drainage channels around the perimeter of the airfield and drains to pump stations that discharge into San Pablo Bay. Limited water quality measurements in the vicinity of the Novato/Ignacio and the Hamilton Field treatment plant outfalls found that annual median values for most physical and chemical water parameters were in compliance with standards set

by the RWQCB in the Basin Plan. However, the annual maximum values of pH, total coliform, turbidity, color, and ammonia exceeded the Basin Plan criteria at times.

4.1.4 Montezuma Restoration Project

Montezuma Wetlands is the site of a privately-sponsored wetlands restoration proposal, referred to as the Montezuma Wetlands Project (MWP). The MWP would use dredged material to restore approximately 730 hectares (1,800 acres) of historic tidal wetlands, providing habitat for a variety of sensitive species that inhabit brackish tidal marshes and shallow-water habitats. The MWP is currently being considered by federal, state, and local agencies. A Final EIR/EIS on the MWP was released for public review in July 1998 (COE and Solano County 1998). This site could be used for sediment disposal from the Oakland project only after receiving all necessary permits.

The Montezuma Wetlands site is located in the Suisun Marsh in Solano County, near Collinsville (see Figure 4-1). The distance from SFOBB to this site is approximately 80 kilometers (50 miles). The MWP applicant proposes to restore tidal wetlands by placing approximately 15.3 mcm (20 mcy) of dredged material over approximately 737 hectares (1,822 acres) of the 969 hectares (2,394 acre) site. The MWP is proposed to be constructed in four phases or cells in order to minimize temporary losses of wetlands during construction and to facilitate engineered placement of dredged material. The MWP would be divided into four phase areas, separated by engineered levees. Each completed phase would be hydrologically independent, and each would have a single connection to Montezuma Slough or the Sacramento River. Phases would range in size from about 97 to 243 hectares (240 to 600 acres). The project will also have a 36.4-hectare (90-acre) rehandling facility for drying of clean sediments that may be used for levee stabilization and landfill daily cover.

The MWP could accept a total of 15.3 million m^3 (20 mcy) of sediment. Up to 20 percent of the dredged material received could be classified as non-cover material and the remaining 80 percent would need to be classified as wetland cover material or better. "Cover" and "non-cover" material is defined by the RWQCB based on sediment test results. Cover material passes leaching and bioassay tests and combines pollutants at concentrations below specified RWQCB criteria. It may be used for wetland creation and restoration. Non-cover material passes leaching tests, and has pollutants in concentrations above cover sediment criteria, but does not exceed non-cover sediment RWQCB criteria.

The dredged sediment would be pumped through transport pipelines to the cells and deposited in layers known as "lifts." Non-cover material would be covered by a minimum 0.9-meter (3-foot) thick layer of cover material. The sediment in the slurry would settle over time. Sand and larger-grained material would settle first, and the finer-grained material would settle last. Water would be decanted off the cells into holding ponds and channels before a subsequent lift of sediment would be placed. The placement and draining operation in each cell would continue until a target elevation is reached. Several cells would be operated simultaneously to allow for disposal of a large quantity of sediments at the same time and for flexibility in receiving and placing cover and non-cover sediments.

The MWP is currently undergoing environmental review and permitting. Permits have not yet been approved and there is public opposition to this project. Although the Solano County Board

of Supervisors has recently approved the Project, a lawsuit has been filed by environmental groups which may delay the opening of the site. It is therefore unknown whether this site will be operational when the East Span Project dredging commences.

Biological Resources

About 300 species, subspecies, and varieties of plants occur in the MWP area. These plants occur in two broad groupings, separated mainly by their elevation with respect to high tide. An upland community, which is less saline and drier, is primarily located on the hills at the eastern edge of the site and on levees and other fill areas within the site. These areas are dominated by introduced and native species of annual and perennial grasses, and native herbaceous species. A lowland community occupies most of the other portions of the site, principally diked and drained areas below high tide. The lowland community includes areas of permanent and seasonal standing waters, with halophytic and hydrophytic plant species. Predominant halophytic species include pickleweed, saltgrass, and alkali heath.

Birds that occur at this site include waterfowl, shorebirds, raptors, and passerines. Of the 89 species identified at the site in recent surveys, 10 were breeding on site, and 45 were migratory species. The most common shorebirds were the long-billed dowitcher (*Limnodromus scolopaceus*), western sandpiper (*Calidris mauri*), and dunlin (*Calidris alpina*). During wet years, migratory waterfowl such as the northern pintail (*Anas acuta*), northern shoveler (*Anas clypeata*), gadwall (*Anas strepera),* and mallard (*Anas platyrhynchos*) have been observed. Although no threatened or endangered bird species were observed on the Montezuma site, special status bird species were observed at or near the site (including American white pelican (*Pelecanus erythrorhynchos*), California gull (*Larus californicus*), and burrowing owl). The grassland areas harbor common landbirds such as horned lark (*Eremophila alpestris*), western meadowlark (*Sturnella neglecta*), and savannah sparrow (*Passerculus sandwichensis*). Seasonality of flooding in these areas provide distinctly different habitat types in the wet versus the dry season. During the wetter periods, these areas support a large array of raptors, migratory waterfowl, shorebirds, and passerine species.

Mammals observed at the site include the California meadow vole (*Microtus californicus*), California ground squirrel (*Spermophilus beechyi*), coyote, raccoon, striped skunk (*Mephitis mephitis*), black-tailed jackrabbit, and Audubon's cottontail (*Sylvilagus audubonii*). River otters (*Lutra canadensis*) have also been seen adjacent to the site in Montezuma Slough. Several small mammals also exist on site, including the federally listed endangered salt marsh harvest mouse.

Because the Montezuma site was diked and drained, it generally lacks permanent water. Consequently, it has little fishery value. However, the Montezuma Slough adjacent to the site is an important rearing and nursery area for salmon and striped bass. Twenty species of fish were collected in the Montezuma Slough during trawl surveys conducted by the California Department of Fish and Game from 1962 to 1974. The delta smelt (*Hypomesus transpacificus*), a federally listed threatened species, and the Sacramento splittail (*Pogonichthys macrolepidotus*), a federally proposed threatened species, may be found in the sloughs of the Delta, such as Montezuma Slough.

Special Status Species. The delta smelt (threatened) is found in Montezuma Slough as is the proposed threatened Sacramento splittail. The Montezuma Slough may also provide rearing habitat for the winter-run Chinook salmon (state and federally listed as endangered).

The salt marsh harvest mouse (state and federally listed as endangered) is present in areas of Montezuma Wetlands project site where pickleweed is dominant or co-dominant species; about 48 hectares (119 acres) of the site are considered good-quality habitat, and about 164 hectares (405 acres) are considered lesser-quality mouse habitat.

Several sensitive species of birds can be found in the area, including northern harrier, golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), loggerheaded shrike (*Lanius ludovicianus*) , salt marsh common yellowthroat, Suisun song sparrow (*Melospiza melodia maxillaris*), and burrowing owl. The burrowing owl is the only species that nests on the site.

The federally listed (threatened) vernal pool fairy shrimp (*Branchinecta lynchi*) also occurs on the wetland restoration site in specific areas.

No federally listed or proposed plant species were found at the site. Masons lilaeopsis (*Lilaeopsis masonii*), a federal species of special concern, was the only legally protected special status species on the project site. Other species were found in the vicinity of the project, but all were outside areas where dredged material would be placed (COE and Solano County 1998).

Water Quality

Hydrology and Drainage. Two small watersheds adjacent to the site with a combined area of about 1,254 hectares (3,100 acres) drain intermittently into the site from the Montezuma Hills to the east. These watersheds support agricultural activities including sheep and cattle grazing and feed production. During major winter storms considerable runoff reaches the site, providing moderate quantities of nutrients and TSS. Surface water in the interior of the site results from rainfall runoff and groundwater discharge. Some of this water collects in seasonal ponds during the winter and spring. The site is drained through a series of shallow channels which flow to two float-activated pump stations.

Potential sources of flooding include daily tidal fluctuations, storm runoff from upland drainage areas, and flooding from the Sacramento-San Joaquin rivers and Delta system. The site is protected from daily tidal flooding by a manmade levee system. This levee forms the eastern bank of Montezuma Slough and the northern bank of the Sacramento River.

Water Quality. The two major surface water bodies in the vicinity of the site are the Sacramento River along the southern site boundary and the Montezuma Slough along the western site boundary. Quality and salinity in these waters vary considerably with tides, season, annual rainfall, and delta outflow. Surface water salinity levels in the immediate vicinity of the site have been affected by the recent installation of the Montezuma Salinity Control Structure. This structure was designed to capture less saline Sacramento River water at ebb tide and tidally pump it to the more saline western Suisun Marsh, to meet state water quality control standards.

On-site shallow groundwater is brackish and unsuitable as a potential drinking water source or for agricultural purposes, and its potential beneficial uses are limited although the deeper aquifer has beneficial uses in domestic, industrial, and agricultural water supply.

Surface water and shallow groundwater quality were obtained by Levine-Fricke at the Montezuma Wetlands site and by the Department of Water Resources (DWR) at five monitoring stations in the project vicinity. Total and dissolved concentrations of inorganic elements that were detected (arsenic, cadmium, chromium, copper, lead, mercury, and zinc) were all below their respective maximum contaminant levels (standards set by the State Department of Health Services), except for one sample for total lead collected from a DWR monitoring station located off site in Suisun Bay near Martinez. Concentrations of total and dissolved arsenic, cadmium, chromium, and mercury levels were below San Francisco Bay Basin Plan objectives. Both total and dissolved concentrations of copper, lead, and zinc exceeded Basin Plan objectives at DWR monitoring stations in the project vicinity. Laboratory detection limits for copper, lead, and zinc were greater than the Basin Plan objectives so it is not known whether samples collected from the Montezuma site exceeded the objectives for these elements.

4.2 UPLAND LANDFILL REUSE AND DISPOSAL

Evaluation of the upland disposal option included identification of several landfills within the general vicinity of the project. The selected landfills were considered based on their capacity to handle the quantity of material potentially generated by the East Span Project. The dredged quantities generated by the project activities are presented in Table 3-1.

The various landfills identified below are grouped by class according to their site-specific characteristics and their ability to minimize the potential for waste to come into contact with the state's water resources. Specific permit restrictions for each landfill may apply depending upon the results of a waste characterization analysis which must be performed within one year prior to disposal.

In general, Class III landfills accept only non-hazardous materials. Class II landfills can accept non-hazardous materials in addition to designated wastes. Class I landfills are subject to the most stringent permitting and operating regulations as they can accept hazardous materials. Based on prior sampling and analysis at the project site, most of the East Span dredged material will not be classified as hazardous and will therefore not require disposal at a California Class I facility.

If the dredged material is determined to be suitable for disposal at a Class III facility, as is expected, then the greatest number of options is available. Figure 4-1 shows the locations of some of the potential landfill sites in relation to the project site.

The following are Class III sites which can accept non-hazardous material only:

- Vasco Road
  - Located in Livermore on Vasco Road off of I-580 in eastern Alameda County. This facility is approximately 60 kilometers (40 miles) by truck from the project site.
- Redwood Landfill
  - Located in Novato on Redwood Hwy, off Highway 101 in northern Marin County. This facility is approximately 60 kilometers (40 miles) by truck from the project site.

- Newby Island
  - Located in Milpitas on Dixon Landing Road off I-880 in northern Santa Clara County. This facility is approximately 60 kilometers (40 miles) by truck from the project site. This facility may be the best landfill choice as it is located on the San Francisco Bay and is specially permitted to receive dredged material.
- Ox Mountain
  - Located near Half Moon Bay on Highway 92 San Mateo County. This facility is approximately 55 kilometers (35 miles) by truck from the project site.

The following is a Class II site which can accept non-hazardous material and designated waste:

- Altamont Landfill
  - Located near Altamont Pass off of I-580 in eastern Alameda County. This landfill is approximately 70 kilometers (45 miles) by truck from the project site.

The following is a Class I site which can accept all waste including RCRA and CERCLA regulated hazardous waste:

- Kettleman Hills
  - Located near Kettleman City off of I-5 in Kings County. This landfill is approximately 320 kilometers (200 miles) by truck from the project site.

It is anticipated that portions of this project-generated material could be utilized as clean fill, daily cover or even as a clay cap under certain conditions including degree of uniformity and hydraulic conductivity.

If any of the material is taken to a landfill, the material must be dried to a moisture content of less than 50 percent by weight prior to disposal. The material cannot contain any free liquids if it is to be transported by truck. The Port of Oakland maintains a temporary rehandling and drying facility (Berth 10) that might be available for use on the East Span Project. Its use and indemnity requirements would need to be negotiated with the Port. In addition, land on the Oakland Touchdown might be apportioned for construction of a rehandling facility during the construction phase of the East Span Project. Environmentally sensitive areas would be avoided. Any rehandling facility within Caltrans right-of-way would need a Storm Water Pollution Prevention Plan (SWPPP) outlining precautions and management practices that would be used to minimize impacts to water quality by eliminating sediment laden discharges to the Bay.

4.3 SIDECASTING

Sidecasting is the process of dredging sediments and placing them to the side of the dredged area, rather than barging the material to a remote reuse/disposal site. This alternative might be useful if sediments are required to be replaced in the dredged areas after construction/dismantling activities are complete.

Sidecasting would only be used during dredging for construction and dismantling access channels which would be dredged in shallower waters near the Oakland Touchdown, subject to all federal and state permits. Sediments removed for pier construction would be taken to an

approved reuse/disposal site. The following section describes the general environmental setting for the area along the eastern portion of the project construction zone.

Biological Resources

Intertidal mudflats occur nearshore and generally to the north of the Oakland Touchdown. Substrate composition in these areas generally ranges from silt and clay to fine sand and includes organic debris and shell fragments. Mudflat vegetation is usually dominated by algae, and the flats support diverse communities of benthic invertebrates including clams, worms, mussels, and crabs. Because mudflats experience periods of exposure, wave action, and varying salinities, the benthic communities are dominated by colonizer species that develop quickly, rapidly reach maturity, and have high reproductive rates (Nichols and Pamatmat 1988). The mudflats provide important foraging areas for shorebirds.

Open water (subtidal) habitat is classified as the area of the Bay below the low tide line (also known as subtidal habitat). Sediment in these areas ranges from silts and clays to coarser sands and gravel in deeper channels near the center of the Bay. Phytoplankton are the dominant plants of the open water areas. Open waters provide habitat for many species of benthic organisms, fish, and birds, as well as marine mammals that occur in the Bay.

Plankton. The plankton community is comprised of photosynthetic phytoplankton, zooplankton (small, free floating or feebly swimming animals), and ichthyoplankton (eggs and larval forms of marine fishes). Phytoplankton abundance varies seasonally in San Francisco Bay, with a relatively low biomass in winter, a large spring to early summer bloom, and a smaller fall bloom. Common species include *Skeletonema costatum*, *Thalassiosira* spp. and *Coscinodiscus*. Phytoplankton are important to the growth and productivity of other organisms including zooplankton and benthic organisms. Common zooplankton species found in the Bay include the copepods *Acartia californiensis* and other *Acartia* species, *Oithona davisae*, *Paracalanus quasimodo,* harpacticoid copepods, tintinnids, and larval forms of gastropods, bivalves, barnacles, and polychaetes. (Ambler et al. 1985; Kimmerer 1998).

Ichthyoplankton populations consist of eggs and larvae of commonly occurring fish species including pacific herring, northern anchovy, Gobiidae (goby), white seabass (*Cynoscion nobilis*), staghorn sculpin, and diamond turbot. Both the number of species and overall abundance are usually highest in winter for most species.

Benthos. The benthic (bottom dwelling) fauna in the Bay are typical of soft-bottomed bays and estuaries and is dominated by mollusks, polychaete worms, and small crustaceans. Mollusks are generally the principal contributors to biomass throughout much of the Bay (Nichols and Pamatmat 1988). Common benthic macroinvertebrates that might be found in sediments near the Bay Bridge include the bivalves *Macoma balthica, Mya arenaria,* and *Saxidomus nuttalli* in intertidal areas and *Gemma gemma, Musculatia senhousia, Mya arenaria*, and *Tapes japonica* in subtidal areas. In general, the most abundant species found in Central and South Bay include amphipods such as *Ampelisca* sp. and *Corophium* sp. (Thompson and Peterson 1998). The Dungeness crab (*Cancer magister*) may also occur in the area. The crab normally inhabits deeper waters (7.6 to 27.4 meters or 25 to 90 feet) but migrates to shallow inlets during the summer months.

Many of the more common benthic species are not native to the Bay and have been transported here in ballast water of ships, or on the shells of oysters brought from the east coast for commercial farming in the late 19th century (Carlton 1979). Among the common introduced species in the Bay are *Mya arenaria, Gemma gemma, Musculatia senhousia*, and some species of *Corophium*. The Asian clam (*Potamocorbula amurensis*) was introduced in the mid-1980s and has been increasing in abundance throughout the Bay in recent years. It is now one of the dominant benthic organisms in many areas (Monroe and Kelly 1992, Thompson and Peterson 1998).

Eelgrass beds have been surveyed and mapped within the project area. Eelgrass is an important habitat for many organisms and may influence benthic community structure by creating a refuge and nursery for small organisms, stabilizing sediments, producing organic matter, and exporting detritus (Phillips 1988). Eelgrass can provide a substrate for spawning of Pacific herring.

Macroinvertebrates and Fish. The open water communities of the Bay are comprised of large, free swimming invertebrates and fish, including many commercially and recreationally important species. Free swimming invertebrates in San Francisco Bay consists mainly of shrimp, euphausids, and other crustaceans. Common shrimp species include *Crangon franciscorum, C. nigricauda, Palaemon macrodactylus*, and *C. nigromaculata* (Hatfield 1985). Bay shrimp are important forage for some species of fish, including sturgeon and striped bass (Smith and Kato 1979).

Examples of fish species common to Central Bay include northern anchovy, topsmelt, jacksmelt, striped bass, white croaker, Pacific herring, and English sole.

Marine Mammals. Open water areas and intertidal mud flats provide foraging habitat for marine mammals including the California sea lion and the harbor seal. These species are protected by the Federal Marine Mammals Protection Act.

Special Status Species. Several listed species of fish may occur in the area as well as two species of special concern. In addition, the marine mammals described above are protected. These species are shown in Table 4-4.

Water Quality

Surface water quality in the vicinity of the East Span is expected to be generally similar to that found at nearby RMP sites. The RMP has monitored water quality at several stations in Central San Francisco Bay in the vicinity of the project area. Table 4-5 presents the range of values from four stations: Alameda, located south of the bridge; Point Isabel, located north of the bridge in the Central Bay; Yerba Buena Island, located near the existing East Span and Horseshoe Bay, located north of the bridge toward the Golden Gate Channel.

Table 4-4
Special Status Species in the Vicinity of SFOBB East Span

Species/Resource	Federal[a]	State[b]
Harbor seal *(Phoca vitulina)*	MMPA	NA
California sea lion *(Zalophus Californianus)*	MMPA	NA
Central California-coast steelhead *(Oncorhynchus mykiss)*	T	SC
Central California-valley steelhead *(Oncorhynchus mykiss)*	PE	SC
Winter-run chinook salmon *(Oncorhynchus tshawytscha)*	E	E
Spring-run chinook salmon *(Oncorhynchus tshawytscha)*	PE	SC
Fall-run chinook salmon *(Oncorhynchus tshawytscha)*	PT	SC
Longfin smelt *(Sprinchus thaleichtys)*	SC	SC
Green sturgeon *(Acipenser medirostris)*	SC	SC

Source: Caltrans 1998.

[a] Federal

E: Listed as endangered under the Federal Endangered Species Act
T: Listed as threatened under the Federal Endangered Species Act
PE: Proposed as endangered under the Federal Endangered Species Act
PT: Proposed as threatened under the Federal Endangered Species Act
SC: Federal species of concern; USFWS lacks sufficient information to support a listing proposal
MMPA Marine Mammal Protection Act

[b] State

E: Listed as endangered under the California Endangered Species Act
SC: California species of special concern
NA: No state status

Table 4-5

Central San Francisco Bay Surface Water Concentrations

Pollutant	Range of Concentrations	Water Quality Objective
Salinity	5-32 ppt	Controllable water quality factors shall not increase salinity of waters so as to adversely affect beneficial uses.
Total Suspended Solids	2-25 µg/L	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Dissolved Organic Carbon	960-3,840 µg/L	No objective
Nutrients:		
ammonia	10.92-159.46 µg/L	Annual mean 0.025 mg/L, maximum 0.16 mg/L
nitrite	185.64-487.34 µg/L	No objective
nitrate	9.24-58.8 µg/L	No objective
phosphate	59.83-207.7 µg/L	No objective
Trace Elements:		
arsenic	1.3-2.1 µg/L	4-day average 9.3 µg/L, 1-hour average 69.0 µg/L
cadmium	0.030-0.10 µg/L	4-day average 9.3 µg/L, 1-hour average 43.0 µg/L
chromium	0.1-3 µg/L	4-day average 50.0 µg/L, 1-hour average 1100.0 µg/L
copper	0.3-3.3 µg/L	1-hour average 4.9 µg/L
lead	0.03-0.9 µg/L	4-day average 5.6 µg/L, 1-hour average 140.0 µg/L
nickel	0.5-7 µg/L	24-hour average 7.1 µg/L, instantaneous 140.0 µg/L
zinc	0.09-8 µg/L	24-hour average 58.0 µg/L, instantaneous 170.0 µg/L

Source: Caltrans District 4, April 1998 (Data from SFEI 1995). Note: µg/L = microgram per liter

This section discusses the options carried forward from Section 4 in terms of implementability, environmental effects (biology and water quality), and potential costs. This information will be used in the decision-making process (Section 6) to select a recommended reuse/disposal option.

5.1 ALCATRAZ (SF-11)

Implementability

The Alcatraz disposal site (SF-11) is the closest disposal site to the East Span Project area, 6.5 to 10 kilometers (4 to 6 miles) away. This option would likely use smaller transport barges (e.g. 2,293 m^3 [3,000 cy] capacity) for ocean disposal (see below) and trips to the disposal site would likely be more frequent.

The site can accept a total of 305,810 m^3 (400,000 cy) per month between October and April and 299,357 m^3 (300,000 cy) per month between May and September. This site has the physical capacity to accept most of the material generated on the East Span Project, depending upon the exact timing of dredging. Since other dredgers use this site and the volume limitations above represent total volumes for all dredgers, the actual volume that could be discharged here would depend on other existing disposal allotments scheduled for the site. The BCDC Road Map lists expected volumes to be discharged by various dredgers.

Although this site is available and is used regularly by Bay Area dredgers, it is generally reserved for disposal of "maintenance" dredging projects only. Maintenance dredging is performed to keep existing channels and marinas at permitted depths. Sediments dredged during maintenance dredging activities are usually recently deposited and relatively unconsolidated materials. "New work" projects are those that involve dredging areas which have not been previously dredged or deepening to depths not previously achieved. Sediments dredged from these projects can be older deposits which can be much more consolidated than recently deposited material. The DMMO has suggested that the East Span Project may not qualify as "maintenance" dredging and thus may not qualify for disposal at SF-11. However, the BCDC Road Map for dredged material disposal in the Bay accounts for disposal of approximately 189,602 m^3 (248,000 cy) of sediment from the SFOBB Retrofit Project, which is the Retrofit Existing Bridge Alternative in the DEIS.

Effects

Biological Resources

Plankton. Dredged material disposal can result in an increase in water column turbidity. The potential effects of increased water column turbidity during disposal operations can include: decreased phytoplankton productivity due to reduction of light penetration; and decreased survival, growth rates, and body weights of zooplankton resulting from clogged and damaged feeding appendages. The extent of these effects depends on the proportion of fine-grained sediments in the dredged material. Turbidity increase during disposal is localized, and most of the disposed material settles to the bottom within minutes to a few hours. Because most of this material settles rapidly, reductions in light attenuation and associated reduction in primary productivity is expected to be short term from a single disposal event. This site is used by many dischargers and the severity of impacts would depend on the frequency of use. At low disposal

volumes and frequencies the cumulative effects of disposal are expected to be negligible (LTMS 1998).

Toxic effects caused by contaminants associated with suspended sediments are not expected to occur because only material that has been determined to be suitable for unconfined aquatic disposal may be disposed of at this site. Sediments are required to be tested prior to disposal.

Benthos. Disposal at SF-11 can also result in the burial of benthic organisms. The potential impacts would depend on the amount of disposed material, frequency of disposal, rate of accumulation, and the types of organisms present. Severity of impacts to benthic organisms would depend on the frequency of disposal events and the volumes disposed of. This site is actively managed (by limitations on the amount and type of materials disposed here) to avoid mounding of materials. Some burial of and degradation of benthic habitat is expected, particularly during high frequency disposal operations. Benthic habitats are expected to recover as disposal volumes at this site are reduced.

Fish. Impacts of dredged material disposal on fish from increased suspended solids include impaired oxygen exchange due to clogging or laceration of gills, reduced food availability due to burial of benthic organisms, reduced visibility for foraging activities, and burial of slower-moving bottom fish (Port of Oakland 1998). Fish that are highly mobile are expected to avoid the disposal plume. Localized effects have been documented around Alcatraz where some fish species have been observed to avoid the area for 2 to 3 hours following a disposal event (LTMS 1998). Many of the species of bottom dwelling fish should also be able to avoid burial during the disposal, although they may be displaced from the area until the disposal area is recolonized by prey species. The displaced fish should be able to feed in adjacent areas. Toxic effects and bioaccumulation in fish are also not expected at this site because only suitable materials can be disposed of here.

Special Status Species. Special status species that potentially occur near the site include Chinook salmon and Pacific herring. Impacts to these species are minimized with monthly volume limits on disposal during critical migration periods when these species might be present.

Water Quality

Water quality parameters potentially impacted by dredged material disposal at Alcatraz include suspended solids, dissolved oxygen, and concentrations of contaminants.

Total Suspended Solids (TSS). Suspended particulates in the water column following disposal can result in the potential for adverse effects on biota, particularly fish. Effects can include clogging of the gills and laceration of the gills, impeding uptake of oxygen. Increased turbidity from each disposal event is not considered significant by the COE, however the cumulative effect of several disposal events over a short time frame may result in substantial elevations of near-bottom turbidity levels (LTMS 1998).

Dissolved Oxygen. Dissolved oxygen levels at the site are generally high. Dissolved oxygen concentrations in the water column, and particularly near the Bay bottom, may potentially decrease during disposal if chemical oxygen demand is increased by the presence of inorganic compounds associated with the dredged material. The effects would generally be short-term and localized (LTMS 1998).

Metals and Other Contaminants. Because only dredged material found suitable for unconfined, aquatic disposal would be deposited at SF-11, adverse impacts on site water by contaminants are not anticipated. Analysis of sediments specific to the proposed alignment of the East Span Project have not been conducted, but a sampling and analysis plan is being prepared and results will be available before dredging occurs. Sampling and analyses of sediments near the existing East Span indicated that most of the material was suitable for disposal at SF-11.

Costs

Disposal costs for SF-11 were estimated at $5.35 per m^3 ($7 per cy). This assumes the use of 2,294 m^3 (3,000 cy) dump scows, single propeller tugs to move the barges to the location, and all labor and mobilization fees averaged over the time frame of the project. This cost does not include dredging and excavation operations. The assumptions used to calculate the disposal costs are included in Appendix B of this report. All costs are shown in first quarter 1999 dollars and include a 25% contingency factor.

5.2 DEEP OCEAN DISPOSAL (SF-DODS)

Implementablity

As described in Section 4, SF-DODS is approximately 55 nautical miles from the proposed dredging location. The site can accept up to 3,669,725 m^3 (4.8 mcy) per year, and could accept all material from the proposed dredging activities for the East Span Project. This site has been used in the past for several dredging projects. One of the requirements of the use of SF-DODS will be to conduct post-disposal monitoring. If other dredging projects are using this site during the same time frame as the East Span Project, costs for monitoring (estimated at approximately $770,000 per year) could be shared between Caltrans and the other parties. Material would be transported to this site in 5,352 m^3 (7,000 cy) barges.

Effects

Biological Resources

Plankton. Dredged material disposal results in an increase in suspended particulates and a corresponding increase in turbidity within the water column. During disposal, potential effects of increased water column turbidity can result in decreased phytoplankton primary productivity due to reduction of light penetration; entrapment and sinking of plankton due to ingestion by or adhesion of particles to the plankton; and decreased survival, growth rates, and body weight concentrations of zooplankton resulting from clogged and damaged feeding appendages (Port of Oakland 1998). The extent of these effects depends on the proportion of fine-grained sediments in the dredged material, which tend to remain suspended within the water column for longer periods than coarser material. EPA has shown that turbidity increase during disposal is localized, and most of the disposed material settles to the bottom within a few hours. Because most of this material settles rapidly, reductions in light penetration and associated reduction in primary productivity would be minor and short term. Effects are expected to last only until the plume dissipates.

Toxic effects caused by contaminants associated with suspended sediments are not expected to occur, because only material that has been determined to be suitable for unconfined aquatic disposal would be disposed of at this site. Sediments are required to be tested prior to disposal.

Potential impacts on the plankton community, such as decreased productivity, growth, survival, and other effects as a result of increased turbidity, are expected to be minimal and only temporary since the dredge plume dissipates relatively quickly within hours.

Benthos. Disposal of dredged material at this site would result in impacts to benthic organisms due to burial. The potential impacts would be dependent on the amount of disposed material, frequency of disposal, rate of accumulation, and the types of organisms present. Burrowing organisms would likely be less impacted or could withstand slightly deeper burial than surface and suspension feeding organisms, which do not possess a strong ability to burrow upward through newly deposited sediments. The Port of Oakland EIS (Port of Oakland 1998) contained information suggesting that average critical burial depths ranged from 5 centimeters (2 inches) for surface feeders to 30 centimeters (12 inches) for active burrowers. Ten centimeters (4 inches) was treated as the critical thickness in the Port of Oakland studies since many of the surface and suspension feeders are also organisms that would rapidly recolonize after a disturbance.

EPA has modeled the dispersion characteristics at SF-DODS for disposal of 4,587,155 m^3 (6 mcy) of sand, silt, and clay over a period of one year. Their results indicated that the footprint of the disposed material was less than 10 centimeters (4 inches) thick over most of the disposal site. The results of modeling disposal of 1,223,241 m^3 (1.6 mcy) at one time indicated that a mound approximately 27 centimeters (11 inches) thick would form at the center of the site. Monitoring results for disposal of 588,685 m^3 (770,000 cy) from Navy projects showed that over a four month period, actual accumulations were approximately 1 to 3 centimeters (.39 to 1.2 inches) over most of the site and 5 to 16 centimeters (1.9 to 6.3 inches) near the center. Biological activity continued at nearly all locations and benthic organisms were recolonizing at a faster rate than anticipated.

The East Span Project would result in disposal of considerably less than what has been both modeled and monitored at the site as described above. The East Span Project would place up to 447,630 m^3 (585,400 cy) (upper limit; refer to Table 3-1) of sediment, which is approximately 10 percent of the 4,587,155 m^3 (6 mcy) analyzed above. The total amount of sediment from the East Span Project would also be placed over an approximate four year period, rather than a one-year period, as was previously studied. Total accumulation of sediments could be expected to be proportionately less.

Impacts to benthic organisms are expected to be limited to areas that are covered by more than 10 centimeters (4 inches) of material which will likely be limited to a central mound that may be formed at the release site. These effects are expected to be temporary as recolonization occurs. The Port of Oakland indicated that they expected disposal of 5,275,229 m^3 (6.9 mcy) over four years to result in only localized, short term effects to the benthos for most of the site. Toxic effects are not expected as the material could not be placed at this site if was not deemed suitable for aquatic disposal after a series of chemical and toxicity tests to be conducted as part of the East Span Project Sampling and Analysis Program.

Fish. As described for the Alcatraz site, potential impacts of dredged material disposal on fish from increased suspended solids include impaired oxygen exchange due to clogging or laceration

of gills, reduced food availability due to burial of benthic organisms, reduced visibility for foraging activities, and burial of slower-moving bottom fish (Port of Oakland 1998). However, fish, which are highly mobile, are expected to avoid the disposal plume so that effects of turbidity are expected to be negligible. Many of the species of bottom dwelling fish should also be able to avoid burial during the disposal, although they may be displaced from the area until the disposal area is recolonized by prey species. The effects of this temporary displacement are expected to be minimal because the displaced fish would be able to feed in adjacent areas. Although some of the more sedentary species present may have more difficulty avoiding burial, fish densities and biomass are low at the site, and potential impacts are expected to be localized and minimal.

Toxic effects and bioaccumulation in fish are also not expected at this site because only suitable materials can be disposed of here.

Mammals and Birds. Impacts to marine mammals and birds in the vicinity of the disposal site are expected to be localized and temporary. Impacts include reduced visibility for foraging activities, reduction in available prey and alteration of passage routes to avoid the turbidity, and ship traffic. Although reductions in water clarity due to increased turbidity during disposal may limit the foraging efficiency of both birds and mammals, reductions in clarity are generally concentrated at the release site, and are of short duration (several hours). Availability of prey items, such as fish, krill, and other zooplankton, may be temporarily reduced in the disposal area because these organisms likely would escape or avoid the disposal plume. Foraging success within the immediate disposal area may be limited temporarily, although birds and mammals are capable of foraging in unaffected areas within the region and should not be significantly affected by any reduction in prey. Feeding activities and passage routes might be altered during disposal operations due to increased ship traffic.

Special-Status Species. As discussed in Section 4, special-status species that have the potential to occur at the SF-DODS and vicinity include winter-run Chinook salmon, central California steelhead trout, California brown pelican, American peregrine falcon, California sea lion, Steller's sea lion, humpback whale (*Megaptera novaeangliae)*, blue whale (*Balaenoptera musculus)*, fin whale (*Balaenoptera physalus)*, and sperm whale (*Physeter macrocephalus)*. Proposed disposal activities could impair visibility for foraging and rescue food availability within the disposal area, which could alter normal feeding or passage activities, however, as discussed above, impaired visibility and reduced food availability would be temporary and localized at the release site.

The listed species range widely and forage throughout the region, so reduction of food supplies in the disposal area would be insignificant. Many of the pinniped species typically forage and range over the continental shelf waters, so few would be affected by disposal activities. Additionally, whales and pinnipeds are highly mobile and are capable of avoiding the dredge plume. Therefore, potential impacts to special-status species are expected to be minimal.

Measures to reduce impacts on the biological community in general at the SF-DODS include accurate positioning to ensure that dredged material is confined within the disposal site boundaries so that adjacent communities are not affected. Measures would also include monitoring the disposal operations and potential effects on the existing pelagic and benthic communities according to the monitoring program specifically designed for SF-DODS and for individual projects using this site. The monitoring program outlined in the EIS for the EPA

Section 102 deep water ocean disposal site (EPA 1993) and the Site Management and Monitoring Plan (SMMP) Implementation Manual for the ocean disposal site (EPA 1998) specify monitoring for both long- and short-term (project-specific) impacts of dredged material disposal.

Water Quality

Local and regional hydrodynamics influence the dispersion and fate of dredged material discharged at SF-DODS. The dispersion of sediment particles can affect water quality conditions. The discussions that follow are based on disposal plume modeling performed by the EPA and the U.S. Navy and summarized by the Port of Oakland (1998).

Disposal of dredged material at the SF-DODS would result in temporary and localized disturbance of water column stratification. Ocean currents, however, would not be affected. Local hydrodynamics can, however, have an effect on the material being disposed by eroding and spreading materials. Near-bottom currents at the site are generally less than 1 cm/sec, although tidal currents may be significantly (up to five times) higher, though these higher velocities have little potential to erode material on the bottom. Periodic turbidity flows (down-slope movement of sediments) may be more significant in eroding and transporting sediments in the vicinity of the SF-DODS though this is not considered an impact.

Water quality parameters potentially affected by dredged material disposal at SF-DODS include salinity, temperature, pH, nutrients, dissolved oxygen, suspended solids, and concentrations of contaminants.

Salinity, Temperature, and pH. Changes in salinity temperature, and pH of ambient waters would occur as the disposed material descends to the bottom. Entrainment of site waters in the disposal plume would cause minimal, localized, and short-term impacts of these parameters at the SF-DODS site.

Nutrients. The addition of nutrients (especially nitrogen and phosphorus) to the area during disposal operations may cause enhanced production of plytoplankton. Increased turbidity resulting from disposal, however, would reduce light transmittance and, as a result, tend to depress primary production. This net effect is expected to be small, transient, and localized within the discharge plume.

Dissolved Oxygen. Dissolved oxygen concentrations in the water column may potentially decrease during disposal if chemical oxygen demand is increased by inorganic compounds that may be associated with the dredged material.

The effects may be most pronounced in the "oxygen minimum zone" (at about 800 meters [2,625 feet]) where ambient oxygen levels are less than 1.09 mg/L. The potential reduction in dissolved oxygen is expected to be restricted to the dredged material plume. Because of the small ratio of disposed volume to volume of receiving waters, it is unlikely that the oxygen content and deep ocean waters would be affected. Therefore, reduction in dissolved oxygen concentrations in the water column would be a temporary impact.

TSS. Similar to the effects from dredging sediments, suspended particulates in the water column following disposal can result in the potential for adverse effects on biota, particularly fish. Excessive particulates in the water can clog the gills of fish and impede uptake of oxygen. The

modeling of dredged material disposal at the ocean site conducted by the Corps of Engineers and described in Port of Oakland (1998) indicated that the exposed elevation of suspended particulate concentration after a 4-hour initial mixing period would be approximately 40 mg/L. Actual measured concentrations were lower, ranging from 19.9 mg/L to 24.2 mg/L. The sediment plumes at SF-DODS ceased to be detectable approximately two nautical miles from the release point, and TSS measured at the boundary of the site four hours after release could not be distinguished from background. These field measurements indicated that the material that remained in the water column was dispersed rapidly. The effects of suspended sediments on fish and shellfish summarized in the literature indicated that biological effects were not noted for concentrations below 1,500 mg/L. No significant effects on the hatching success of herring were noted at concentrations as high as 5,000 mg/L. Based on this information, impacts within the water column caused by suspended sediment alone would not likely be substantial.

Metals and Other Contaminants. Biological uptake of chemical constituents could occur at the ocean site. However, because only dredged material found suitable for unconfined, open-water disposal would be deposited at SF-DODS, significant adverse impacts on site water by contaminants are not anticipated. Analysis of sediments specific to the proposed alignment of the East Span Project have not been conducted, but a sampling and analysis plan is being prepared and test results will be available before dredging occurs. Sampling and analyses of sediments near the existing bridge indicated that most of the material was suitable for aquatic disposal.

The SMMP Implementation Manual for SF-DODS (EPA 1998) provides a basis for making site use management decisions using data collected in a tiered monitoring program. The plan was devised to avoid or mitigate adverse environmental impacts at and adjacent to this site. The SMMP also lists several provisions for site use that have been incorporated into the disposal site use permit (in the MPRSA Section 103 process) that aim to (1) restrict the inadvertent disposal of material in transit to SF-DODS, (2) define a target for material release, and (3) provide guidelines for compliance monitoring of these restrictions (Port of Oakland 1998).

Following dredged material placement, a tiered monitoring program would be required to address the effects of dredged material on the marine environment.

Costs

Disposal costs for SF-DODS were estimated at \$9.18 per m^3 (\$12.00 per cy). This does not include the cost of dredging/excavation of the material. Disposal costs were estimated assuming the use of 5,352 m^3 (7,000 cy) barges, twin propeller tugs to move the barges, and an approximately 20 hour round trip tow time. Monitoring the site for one year (approximately \$770,000 per year) has also been incorporated into this estimate. This assumes that if this site is used for a longer period of time, monitoring costs can be shared with other users. Assumptions used for determining disposal costs can be found in Appendix B.

5.3 UPLAND WETLAND RESTORATION SITES

5.3.1 Hamilton Wetlands Restoration

Implementablity

The Hamilton Wetlands Restoration project is managed by the California Coastal Conservancy and BCDC. The City of Novato is managing the contracts for preparation of a conceptual restoration plan. The site is not currently permitted for placement of dredged material. Technical studies have been conducted, and NEPA/CEQA environmental documentation is currently being prepared for the project. A Draft Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) was circulated in August 1998 and the Final EIS/EIR was released in February 1999. Under the preferred alternative, up to 6,422,018 m^3 (8.4 mcy) of dredged material could be used to restore the wetland. Materials must be "clean" and classified as cover material suitable for wetland creation.

Funding for construction of the project is included in the Water Resources Development Act (WRDA) that is currently before the U.S. Congress. If WRDA is passed this year, the Coastal Conservancy believes that the project could begin accepting dredged material by about midyear 2000. If the vote on WRDA is postponed, the Hamilton project might not begin until the year 2001, and would be unavailable to accept sediments during at least the first portion of the East Span Project.

This site is approximately 29 kilometers (18 miles) from the East Span Project site. To place material at this site, barges (2,293 to 3,823 m^3 [3,000 to 5,000 cy]) would dock offshore in San Pablo Bay at a barge mounted pumping station. Sediments would be pumped as a slurry (sediment/water mix) through an approximately 8 kilometer (5-mile) pipeline to the site. The pumping facilities are planned as part of the project to be used primarily for reuse of sediments from federal navigation dredging projects. If the federal projects begin before the East Span Project, the pumping facilities would already be in place and Caltrans would need to pay only the costs of the crew used to operate the equipment and other operational costs such as electricity (pers. comm. Steve Goldbeck, BCDC). If Caltrans wishes to place sediment prior to deployment of the equipment for the federal projects, then the costs for deployment of the equipment, as well as operational costs, would be borne by Caltrans. In addition, the pumping equipment will not likely be continuously deployed at the site. Caltrans would need to schedule sediment deliveries during times when the equipment is on-site in order to avoid deployment costs.

Current estimates of dredge quantities for the East Span Project indicate that a maximum of approximately 93,000 m^3 (122,000 cy) per month would be placed during months 4 to 6 of the project. This quantity could be easily handled at the Hamilton site with proper scheduling of barge arrivals.

Effects

Biological

The biological impacts of the five alternatives for the Hamilton Wetlands Restoration project have been assessed in a Draft EIS/EIR dated August 1998. The results of this analysis are

summarized below for the preferred alternative. This alternative would restore the airfield as well as State Lands Commission property to the north, using dredged materials in the restoration. Impacts from placement of dredged material at the Hamilton site would not be attributable specifically to the reuse of the East Span Project material because the site would be used for other projects regardless of whether Caltrans placed material here. Mitigation measures for the site are the responsibility of the project sponsors.

The majority of biological effects of the Hamilton Wetlands Restoration are related to temporary construction impacts to habitats and special status species. During construction activities, certain habitat types may be disturbed, including coastal salt marsh and brackish marsh. With required mitigation, these habitats will generally be reestablished in greater amounts or impacts would be minimized through avoidance. Impacts to special status species are generally related to habitat disturbances. These impacts will be minimized by monitoring marsh development and implementing measures to increase the rate of marsh development, if necessary. At the stage of site preparation, direct impacts to special status species will be minimized by avoiding levee construction or alteration during critical seasons and surveying for the presence of special status species before construction is initiated. Impacts and mitigation associated with the Hamilton project, regardless of the source of the dredged material, would be the responsibility of the Hamilton project sponsor.

Water Quality

Hydrology and water quality impacts from the Hamilton Wetlands Restoration are expected to be minor. Lands adjoining the HAAF parcel are drained by a series of pipes and channels. The New Hamilton Partnership owns lands adjacent to HAAF and has recently constructed a stormwater pumping station near the southwest corner of the parcel. Restoration of tidal wetlands would encroach on the drainage outlet channel for the New Hamilton Partnership property. The Hamilton Wetlands Restoration project design will allow for drainage.

Surface and groundwater quality impacts are all expected to be less than significant. Sediments accepted for reuse at this site will only be clean "cover" material and will need to meet RWQCB screening criteria.

Costs

A number of variables will govern the costs for reuse at the Hamilton Wetland Restoration Project. For example, the number of pump stations available, pumping capacity, the need to mobilize pumping equipment, and schedule with other users of the site may alter costs. Costs for this site were estimated assuming that mobilization of a pumping station at the beginning of the East Span Project will be necessary. If federal navigation dredging projects have already begun, the pump station(s) may already be in place and costs might be somewhat less. The estimate also assumes the use of 2,293 m^3 (3,000 cubic yard) barges and a pumping capacity of about 2,293 m^3 (3,000 cubic yards) per day. All labor for transport, offloading, and other equipment mobilization fees were included. It is assumed however, that once material is offloaded at Hamilton, no costs to Caltrans will be incurred to move material around the site itself.

Based on these assumptions, costs were estimated at $17.59 per cubic meter ($23.00 per cubic yard) averaged over the life of the project. This cost does not include dredging. Assumptions used for determining disposal costs can be found in Appendix B.

5.3.2 Montezuma Wetlands Project

Implementability

The Montezuma Wetlands Project (MWP) is located in the Suisun Marsh near Collinsville. This approximately 970 hectare (2,400 acre) site is a privately sponsored project. Impacts related to placement of dredged material at the Montezuma site would therefore not be specifically attributable to the reuse of the East Span Project material because the site would be used for other dredging projects, regardless of whether Caltrans placed materials here. The project sponsor proposes to restore tidal wetlands by placing approximately 15,290,519 m^3 (20 mcy) of dredged material over approximately 728 hectares (1,800 acres) of the site.

Use of this site would require transporting material approximately 50 miles by barge. The site will be able to accept both cover and non-cover materials. In other words, some material accepted at this facility may not be suitable for aquatic disposal or wetland creation. This material would be placed first and covered with cleaner material. All of the infrastructure, including pumping stations, pipelines for sediment placement etc., would be developed by the project sponsor. The project will also include a rehandling/drying facility. Material would be transported by barge (2,293 to 3,823 m^3 [3,000 to 5,000 cy]) to the site and the project sponsor would handle the material from that point on. Costs for receiving the sediment would be offset by a tipping fee to be charged by the project sponsor.

A Final EIS/EIR has been prepared, although permits have not yet been approved for this site. There has been significant public opposition to this project, due to concerns regarding handling of "non-cover" material. Mitigation was incorporated and the Solano County Board of Supervisors has recently approved the project. Permitting will now begin and the project sponsors expect to begin accepting sediments by late 1999 (Doug Lipton, Levine Fricke pers. com.). It should be noted however that a lawsuit has recently been filed by environmental groups opposed to the project. The effect on the timing of the opening of the Montezuma site is unknown.

Effects

Biological

Potential impacts to biological resources during implementation of the project are fully described in the MWP Final EIR/EIS and are summarized here. If the Montezuma Project goes forward, these impacts would occur regardless of whether Caltrans places sediments at the site since the project would be accepting dredged material from other sources as well. Impacts and mitigation associated with the Montezuma project, regardless of the source of dredged material, would be the responsibility of the Montezuma sponsor.

Some of the potential biological impacts associated with the Montezuma site relate to the proposal to accept material classified as "non-cover." "Non-cover" material is material that is

not considered hazardous by California Code of Regulations Title 23 standards, but does contain low concentrations of contaminants which make it unsuitable for aquatic disposal. Impacts at the MWP range from potential exposure of wildlife to non-cover sediments before the material has been covered with cleaner material, to the potential for plant uptake of contaminants and subsequent reintroduction of the contaminants into the food chain. These risks are considered low, but potentially significant if they occur. It is believed that these impacts can be minimized through proper placement of non-cover materials and careful monitoring of potential bioaccumulation. If adverse effects are indicated during operation of the project, areas would be remediated by techniques such as additional capping, isolation of the area, or bioremediation techniques.

Other potential impacts relate to loss of existing habitat at the site and/or changes in habitat functions and values which may affect the support of listed species occurring at the site. For example, the project would eliminate or alter habitat supporting the salt marsh harvest mouse and burrowing owl. Mitigation would be implemented to create or enhance similar habitat both on-site and at off-site locations, at ratios negotiated with the wildlife resource agencies.

Successful restoration of tidal shallow water, wetland habitats, and habitats supporting sensitive species could provide significant ecological benefits.

Water Quality

Potential impacts to water quality and hydrology during implementation of the project are fully described in the MWP Final EIR/EIS. Impacts and mitigation associated with construction and operation of the Montezuma project, regardless of the source of dredged material would be the responsibility of the project sponsor.

Water quality impacts include the potential for erosion of placed sediments in any non-cover material and a subsequent release of contaminants into the water. To mitigate for this, areas containing non-cover materials would be isolated using levees created of cohesive clays and slopes designed to minimize erosion potential.

The project proposes to use water from the Sacramento River to create sediment slurries for off-loading and placement of the material. Excess water would be discharged to the river and if contaminated, could exceed water quality standards. Water would be stored in a pond prior to discharge to the river. Water in the water pond would be monitored and measures including increased settling time and treatment would be implemented prior to releasing the water back to the river. The project operators would be responsible for water quality monitoring and for meeting water quality objectives.

All of the impacts associated with the Montezuma project would be attributed to that project and would not be a result of reuse/disposal of materials from the East Span Project at this site.

Costs

Costs for reuse of dredged material at the MWP were estimated at \$35.17 per m^3 (\$46.00 per cy). This cost includes a \$12.23 per m^3 (\$16.00 per cy) tipping fee that the MWP will charge users. This assumes the use of 3,000 yard barges. Five barges would be needed to meet the cycle times to and from this site. The cost does not include mobilization or labor for offloading the sediment

at the site. It is assumed that these costs are incorporated into the $12.23 per m^3 ($16.00 per cy) tipping fee. Assumptions used for determining disposal costs can be found in Appendix B.

5.4 LANDFILL DISPOSAL

Implementability

Several factors should be considered with respect to implementation of the landfill disposal option. Since the material will be dredged from the bottom of the San Francisco Bay it will be saturated upon removal. In this condition it is too wet to be hauled by truck and too wet to be acceptable as fill or cover at any landfill.

Therefore some provision is required to dry and stockpile the material prior to transport. This will require multiple handling of the material. It must first be loaded onto a barge then off-loaded to a receiving area where it must be "worked" with heavy equipment in order to obtain a suitably low moisture content for transport and disposal. As described in Section 4, the Port of Oakland Berth 10 facility or a portion of the Oakland Touchdown could potentially be used as temporary rehandling sites.

At this point the material can be loaded onto tarped end-dump trucks with approximately 9.2 m^3 (12 cy) of capacity given the nature of the material. This would require a substantial number of truck trips to transport all of the material. Near the beginning of the project, approximately 3,100 m^3 (4,000 cy) per day will be dredged. If this material were dried and trucked to a landfill site at the same rate, this would amount to approximately 340 truck trips per day.

Effects

The landfill disposal option would use existing permitted facilities constructed and operated specifically for this purpose. Through their respective permitting processes, each of these facilities has already met applicable federal, state and local requirements to assess and mitigate against adverse effects to the environment and the public health and safety. Therefore, this option would not introduce new effects which would merit consideration. This option could be exercised under existing operating permits excepting any routine transportation permits which may be required.

Impact to Longevity

Use of landfill for disposal of dredged materials raises concern about the impact of such disposal on the longevity of the landfill and the indirect impact upon a county's future landfill capacity. Those concerns can be shown as negligible on the basis of the most conservative assumptions of a single landfill and accommodation of all dredged material (as clean cover or disposal fill). According to discussions with Redwood Landfill personnel, the total amount of material is not expected to shorten the life of Bay Area landfill capacity even if all material were to be transported to landfills (Joseph Lynch, Redwood Landfill, personal communication, on 2/24/99). Using the throughput of 2,970 m^3/day (2,300 cy/day), representative of the Redwood landfill facility, it would take 0.56 years, or between 6 and 7 months, to dispose of the entire volume. Given a 50-year lifetime for the Redwood facility, the hypothetical case of the exclusive disposal

of all material at a single landfill would reduce that landfill capacity by approximately one percent. Therefore, disposal of all material or of a fraction of it would not have a substantial impact on the overall landfill capacity of the Bay Area counties.

Costs

Based on discussion with several Bay Area landfill operators, the costs for upland disposal will vary depending on the location chosen due to transportation, handling and other costs. Assuming use of a Class II landfill which can accept non-hazardous and designated wastes, costs were estimated at $59.63 per cubic meter ($78.00 per cubic yard).

Material taken to these facilities must be dried before it can be handled. This requires double handling of the material; after dredging, the material must be taken to a facility where it is spread and mixed in order to dry it to the point where it can be placed on trucks for hauling to the facility. The cost estimate assumes that a 4 hectare (10 acre) rehandling facility, such as the Port of Oakland's Berth 10 rehandling facility or a location on the Oakland touchdown, would be available. No costs have been included for a rehandling facility.

On rare occasions and depending upon the immediate needs of a given landfill, a landfill operation may pay a small price (e.g., generally less than $3.80 per cubic meter [$5 per cubic yard]) for clean cover material. In most cases, the best a landfill will offer for clean cover material is to dispose of the material without a charge from the landfill. Waste Management, a company that owns and operates several landfills in the Bay Area, may be closing one of its facilities soon, in which case it may need relatively large quantities of clean material to cap the landfill. Depending on the timing of the landfill closure (uncertain at this time) and the East Span Project dredging, this may be an option for the use of clean dredged materials.

Costs for drying, handling, and trucking the material would still be incurred. The amount that might be paid for the material would likely be more than offset by the costs of handling required for this option. Assumptions used for determining upland disposal costs can be found in Appendix B.

5.5 SIDECASTING

Implementability

As discussed in Section 3, sidecasting would involve placing the dredged material near the dredged channel. Sidecasting, if approved, would only be used during dredging for construction and dismantling access channels. Sediments removed for pier construction would still be taken to an approved reuse/disposal site. Sidecasting might be useful if sediments must be replaced in the dredged access channels after construction/dismantling operations are complete.

There are two approaches to sidecasting. The first method would pump sediments as a slurry through a pipe to the desired location next to the channel. The second method would place clamshelled material onto a barge. The barge would then move to the side of the dredged channel and the material would be placed back into the water using a clamshell bucket. Slurry pumping would be the most cost effective method, but would also create the largest sediment

plume and greatest impacts to water quality and biological resources. The second method is significantly more expensive due to double handling of the material.

Effects

Impacts of sidecasting would be generally similar to those already described for disposal at Alcatraz (SF-11) and offshore (SF-DODS). The primary impacts would be increased turbidity with associated water quality effects such as temporarily decreased dissolved oxygen levels, and burial of benthic organisms. Increased turbidity in the area from sidecasting would be in addition to turbidity created during the sediment removal operations. Fish and mammals in the area are expected to avoid the turbidity plume. The extent of the turbidity plume and length of time it is expected to persist would depend upon local conditions of wind and current at the time the material is placed and the method used for sidecasting. As discussed above, pumping slurried material back in to the Bay is expected to create a much larger turbidity plume than placement of clamshelled material.

This method may create cumulative impacts in that the impacts from dredging and disposal would occur in the same vicinity. If material needs to be placed back into the dredged channels to refill them, impacts similar to those described for dredge material disposal would occur during the refilling operations.

Turbidity caused by sidecasting could affect migrating special status fish species including Chinook salmon and steelhead, as well as other important species or species of special concern including green sturgeon, longfin smelt and Pacific herring. Dredging with sidecasting would need to be conducted during times when special status species (e.g., Chinook salmon) would be least affected or dredging activities would be temporarily curtailed during spawning. Silt curtains may also be used during dredging and sidecasting operations to contain the sediment plume as much as possible.

There are extensive eelgrass beds in the vicinity of the Oakland Touchdown (See Figures 3-2 through 3-4). Eelgrass is somewhat rare in San Francisco Bay and is important to the ecosystems because Pacific herring attach eggs to the plants during spawning. The eelgrass could be impacted by sidecasting due to the potentially high turbidity levels causing sedimentation on the plants and reduced light penetration which can reduce photosynthetic activity and diminish plant growth and reproduction.

Costs

The cost of sidecasting was estimated at $13.00 per cubic meter ($17.00 per cubic yard) since sidecasting involves dredging and placement of the material in essentially the same location; this cost includes the cost of dredging. This cost assumes that material can be dredged and pumped to the drop off location as a single step. However, this method can create a great deal of turbidity in the area. Clamshell dredging would create less turbidity. If a clamshell is used for dredging and sidecasting, costs would rise to $27.53 per cubic meter ($36.00 per cubic yard). Because of the width of the channel, and the reach of typical clamshell dredges, some of the material might need to be dredged more than once. Material would be dredged and placed as far to the side as possible. However, because of the reach of the dredge, this may not be outside the ultimate

width of the channel. Thus, this same material would need to be dredged again and placed farther to the side; this would increase the handling and increase the costs. Assumptions used for determining sidecasting dredging and placement costs can be found in Appendix B.

This section discusses the applicability of the Long-Term Management Strategy (LTMS) to the East Span Project in terms of goals and policies, and the LTMS preferred alternative. It also introduces the decision-making criteria to be used to arrive at feasible dredge-and-reuse/disposal approachs in Section 7.0.

6.1 APPLICABILITY OF THE LTMS TO THE EAST SPAN PROJECT

Discussion of the LTMS goals and policies

Dredged material disposal in San Francisco Bay has been a controversial subject for some time. In 1990, a consensus-based approach, the "Long-Term Management Strategy," was initiated by a group of federal, state, and local agencies to address and resolve the issue of dredging and dredged material disposal in the Bay Area. The signatories to the LTMS are the COE, RWQCB, SLC, EPA, and BCDC. The LTMS program signatories established a pilot DMMO in 1995. The DMMO program is reviewed every six months, and is charged with fostering a comprehensive and consolidated approach to the processing of dredging reuse/disposal permit applications.

An LTMS Policy Environmental Impact Statement/Programmatic Environmental Impact Report (1998) has developed policy recommendations and strategies for the placement of dredged material in the Bay region. The LTMS aims at three objectives:

1. To distribute the dredged material among the three environments (UWR, ocean, and in-Bay) in a manner that minimizes environmental impacts and maximizes environmental benefits in an economically sound manner.
2. To identify guidelines for use during project planning to avoid or reduce potential harm while conducting necessary dredging and disposal activities.
3. To develop policies to improve regulatory certainty across all disposal options.

Each of those objectives translates, respectively, into the following LTMS proposed actions:

- Dredged material placement distributions
- Comprehensive analysis of environmental impacts and risks (including cumulative impacts), and mitigation of potential adverse environmental effects
- A management system that successfully improves regulatory certainty

Despite its comprehensive scope, the LTMS only addresses the needs of routine maintenance dredging projects (that is, dredging to maintain needed operational depth at marinas, harbors, ports and channels). The LTMS does not address the specific needs of "new projects," i.e., those that involve new construction or alteration of existing depths. While it has been the implicit policy of LTMS to effectively discourage "new project" dredged material for in-Bay disposal, the LTMS does not consider directly the overall environmental benefit/impact and practicability of alternative placement of new project sediments at either ocean or upland/wetland sites. One of the shortcomings of the LTMS is a lack of forecast of the relative contributions of routine (maintenance) and new work projects over the long-term and transition period. Since new work accounted for 66.5 percent of the actual 1997 dredge volume and 41.5 percent of the 1998

projected dredge volume, this is a substantial problem that affects the goal of regulatory certainty. At the same time, ocean disposal accommodated 92.1 percent of the 1997 dredge volume from new work projects, and has been planned to accommodate 96 percent of the projected new work 1998 dredge volume (1998 Roadmap).

The LTMS Preferred Alternative

The LTMS preferred policy alternative combines the highest level of upland/wetland reuse and the lowest level of in-Bay disposal of all alternatives considered in the EIS/EIR. Under the preferred alternative, the proposed long-term average targets are 20 percent disposal in the Bay, 40 percent disposal in the ocean, and 40 percent placement at upland/wetland reuse sites. In order to achieve the 20/40/40 disposal distribution, the LTMS has proposed to decrease the in-Bay disposal limit to a final volume of about 764,600 m^3 (1 mcy) per year. The LTMS has conceived a transition period for the implementation of its goals whereby the in-Bay disposal limits will be reduced every third year by 290,520 m^3 (380,000 cy) from an initial overall in-Bay volume of 2,140,673 m^3 (2.8 mcy). While the total disposal limit is reduced over time, a contingency volume of 229,358 m^3 (300,000 cy) and a set-aside volume of 191,131 m^3 (250,000 cy) for "small dredgers" will remain unaffected. The transition period would begin after the signing of the LTMS Record of Decision (ROD) and acceptance of a management plan, and would extend for 12 years. It should be noted that the Biological Opinion for the LTMS may affect disposal restrictions. If so, this may also affect reuse/disposal options for this project.

The LTMS preferred alternative relies on ocean disposal (SF-DODS) as a "relief valve" between the slow mandatory reduction at in-Bay sites and an increase in placement at UWR sites. The LTMS recommends that the current interim SF-DODS disposal limit of 3,669,725 m^3 (4.8 mcy) be set as permanent. Given the annual dredge volume of 4,587,156 m^3 (6 mcy) that is the planning basis of LTMS, ocean disposal could conceivably accommodate up to 80 percent of the total annual dredge volume until such time that speculative UWR sites become available. That recommended strategy is not expected to have adverse environmental impacts at the SF-DODS site. However, it detracts from the overall goal of encouraging upland/wetland reuse options. The initial overall annual in-Bay disposal limit proposed by LTMS at the start of the transition period is 2,140,673 m^3 (2.8 mcy). This initial volume represents 46.7 percent of the total LTMS planning basis volume of 4,587,156 m^3 (6 mcy).

Because of the rapid increase in new projects (whose dredged material are allocated to sites other than the Bay), the goals set by the LTMS for the transition period would be met even before implementation of the management plan. In fact, only after 9 years during the LTMS transition would the in-Bay disposal limits be reduced to the same volume levels already experienced in the last two years. Table 6-1 presents the percentage distribution of dredged volumes among in-Bay, ocean, and upland sites for recent years and as projected in the LTMS transition.

The 1998 projected in-Bay volume has been reduced considerably by the rescheduling of some Caltrans retrofit dredging activities. In 1998 Caltrans had disposed of only about 22,936 m^3 (30,000 cy) as opposed to the 468,257 m^3 (612,480 cy) planned for 1998 (BCDC 1998). Deducting from the 1998 projected disposal the volumes from those Caltrans projects that have not been implemented as planned, the actual percentage of in-Bay disposal from the 1998 total was as low as 33 percent.

Table 6-1
Disposal Distribution Percentages

	1997 Projected	1997 Actual	1998 Projected	1st- 3rd year of transition
In-Bay	45.8	34.6	42.3	46.7
Ocean	47.5	61.0	40.0	?
Upland	6.7	4.4	17.7	?

Raw data source: 1998 Roadmap and LTMS Policy EIS (LTMS 1998)

Application of LTMS to East Span Project

The LTMS does not account specifically for the cases of replacement alternatives for retrofit projects that necessitate a dredging and disposal component. The LTMS recognizes the following dredger categories:

- *Small dredgers*: defined as projects within channels, harbors, and marinas not exceeding a depth of 3.7 meters (12 feet) or a volume of 38,336 m^3 (50,000 cy) per year on average.
- *Major dredgers*: projects with depth of 4 meters (13 feet) or more. For the purposes of implementation of the LTMS preferred alternative, major dredgers are further classified as *COE maintenance* projects and *medium dredgers* (non-COE).

Future in-Bay disposal will be allocated among small, medium, and COE projects according to the approaches adopted during the LTMS Management Plan. No project proponent, including small dredgers, will be allowed to dispose in the Bay if UWR or ocean disposal options are practicable for them. With that caveat in mind, the LTMS transition period strategies put forth in the EIS/EIR indicate that medium dredgers would be considered for in-Bay allocation on a first-come, first-served basis. Medium and COE projects would be allocated a disposal volume at the in-Bay sites within the total disposal limit established after accounting for a "small-dredger set-aside" and a "contingency volume." Depending on the strategy adopted, medium dredgers may engage in "banking" and "trading" of their allotments, that is, using the disposal allocation at a later year or exchanging it with another dredger.

The dredge volumes for the originally proposed SFOBB retrofit were accounted for as part of the 1998 Roadmap, the SAPs were approved for it by the DMMO, and in-Bay disposal suitability was determined. Since 1998 is past, Caltrans may be able, as a medium dredger, to "bank" on its unused allotment.

Another area of uncertainty to be defined in the LTMS Management Plan is whether "contingency volume" disposal may be used for dredged material from either the replacement bridge construction or existing bridge dismantling. The annual contingency volume of 229,357 m^3 (300,000 cy) for the in-Bay sites is meant to accommodate emergency or unforeseen situations.

DMMO

The LTMS program signatories have established a pilot DMMO. The DMMO is working towards improving coordination and implementation of the laws, regulations and policies of the member agencies as part of a cooperative permitting framework. The purpose of the DMMO is to increase the efficiency and reduce the redundancy of the dredging permitting process. The DMMO has devised a consolidated dredging and dredge material reuse/disposal permit application form. The DMMO consolidated application may not be used for any new work projects involving over 76,453 m^3 (100,000 cy) in a five-year period or for disposal projects seeking authorization for a period longer than five years. Such projects require a standard BCDC application.

While the individual member agencies continue to meet their statutory requirements, the DMMO makes joint staff reviews and recommendations regarding:

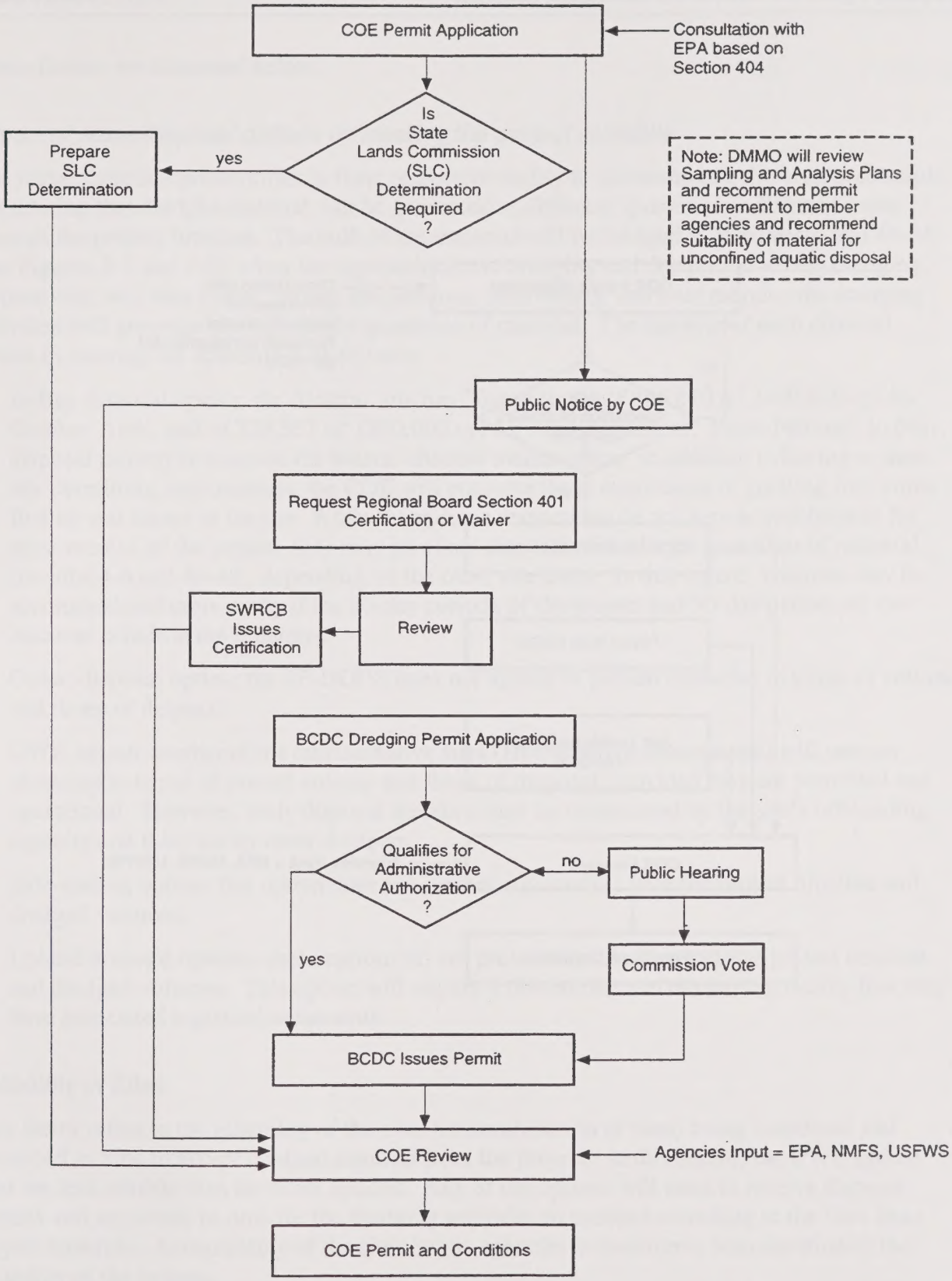
- Approval of sampling and testing plans;
- Testing results
- Completeness of consolidated permit application
- Material suitability for disposal at existing in-bay disposal sites, ocean disposal site, and upland disposal sites.

DMMO staff members may sign a DMMO recommendation for a given site only if their own agencies have regulatory authority over that site. Following DMMO recommendations regarding dredging material suitability, disposal permit decision-making procedures for in-Bay and ocean sites involve different regulatory agency requirements. Those procedures are presented in a schematic and simplified manner in Figures 6-1 and 6-2, respectively. It is likely that separate authorization will be required for the use of aquatic disposal sites on this project and that individual applications to the regulatory agencies will be required. Permitted upland wetland reuse/disposal and upland landfill disposal sites have their individual regulatory requirements. Those are the responsibility of the site operators and are not directly relevant to the DMMP. If the dredging project involves disposal at a wetland site that is not already authorized, individual applications to the regulatory agencies will be required.

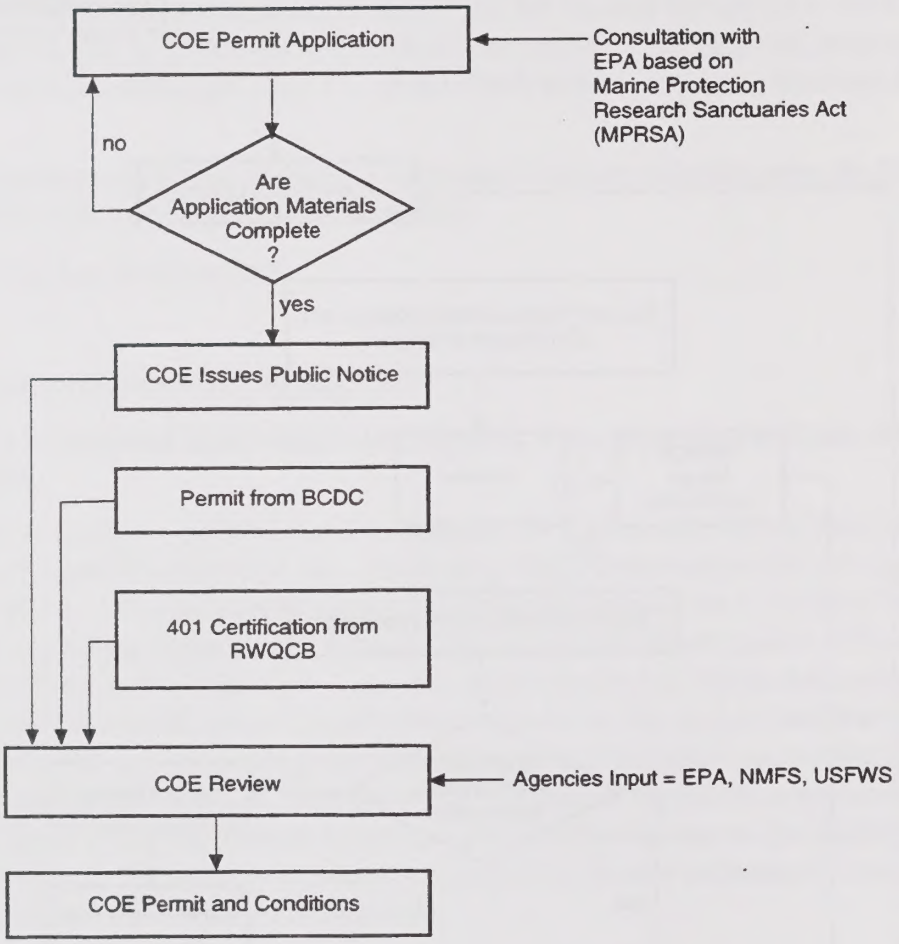
6.2 DECISION-MAKING CRITERIA

In addition to the factors of implementability, effects, and cost, Caltrans has considered the following factors in developing the proposal for reuse/disposal of dredged material:

- Impact of reuse/disposal options on meeting the project schedule
- Reliability of sites
- Consistency with LTMS goals
- Consistency with individual permitting requirements of DMMO member agencies
- Results of the sediment testing program



Project No. 971080NF	SFOBB East Span Seismic Safety Project	IN-BAY DISPOSAL PERMIT PROCEDURES	Figure 6-1



Project No. 971080NF	SFOBB East Span Seismic Safety Project	OCEAN DISPOSAL PERMIT PROCEDURES	Figure 6-2

These factors are discussed below.

Impact of reuse/disposal options on meeting the project schedule

The reuse/disposal options differ in their respective ability to accommodate the project schedule, considering that dredged material will be generated in different quantities at different times through the project timeline. The bulk of the material will be dredged at months 4-6 and 46-48 (see Figures 3-7 and 3-8), when the approach access dredging and demolition access dredging, respectively, will take place. During the previous, intervening, and later months, the dredging activities will generate low and steady quantities of material. The impacts of each disposal option in meeting the schedule is as follows:

- In-Bay disposal option: the Alcatraz site has 30-day limits of 305,810 m^3 (400,000 cy) for October-April, and of 229,357 m^3 (300,000 cy) for May-September. From February to May, disposal priority is reserved for federal channel maintenance. In addition to having to meet any permitting requirements, the COE will consider these restrictions in granting first-come first served access to the site. While the volume restrictions do not appear problematic for most months of the project, they may preclude disposal of the larger quantities of material (months 4-6 and 46-48), depending on the other site users. In this regard, volumes may be accommodated more easily if the 30-day periods of the project and 30-day periods of the Alcatraz schedule are staggered.
- Ocean disposal option: the SF-DODS does not appear to present obstacles in terms of volume and times of disposal.
- UWR option: neither of the representative sites (Hamilton nor Montezuma) will present obstacles in terms of overall volume and times of disposal, provided they are permitted and operational. However, daily disposal amounts may be constrained by the site's off-loading capacity and their use by other dredgers.
- Side-casting option: this option does not present any conflict with the project timeline and dredged volumes.
- Upland disposal options: these options do not present any conflict with the project timeline and dredged volumes. This option will require a dewatering and rehandling facility that may have associated logistical constraints.

Reliability of Sites

This factor refers to the reliability of the sites (or combination of sites) being functional and permitted in time to accept dredged material from the project. In this regard, the UWR option sites are less reliable than the other options. Any of the options will need to receive disposal permits and approvals in time for the dredging activities to proceed according to the East Span project schedule. Acceptability of the sites by the agencies is therefore a consideration of the reliability of the options.

Consistency with LTMS

The LTMS goals apply to average annual disposal volumes as a whole. Therefore, an individual project cannot be judged in isolation from other projects considered in a given year, or within a specified planning period. The applicability of the LTMS to the project is discussed in Section 6.1. While the LTMS framework will be further articulated in a Management Plan, the dredging and disposal component options of the East Span Project correspond to the LTMS program goals in the following manner:

- In-Bay disposal option: may be considered inconsistent with the goals of the LTMS even though retrofit volumes have been deemed suitable for in-Bay disposal.
- Ocean disposal option: considered as preferable to in-Bay disposal, and not detrimental to the environment when within interim disposal limit; would be consistent with LTMS goals.
- UWR option: this is the preferred LTMS destination whenever available and practicable.
- Sidecasting option: the LTMS does not address sidecasting specifically. However, a non-designated, unapproved site, would likely not be considered consistent with LTMS objectives.
- Upland disposal option: this option is likely to be reserved for any portion of dredged material determined to be contaminated, or for the reuse of clean material, such as for capping, or use as fill in other highway projects, and as such is considered to be consistent with LTMS objectives.

Consistency with individual permitting requirements

The regulatory framework that would govern the proposed dredging and reuse/disposal options involves:

- National Marine Fisheries Service (Fish and Wildlife Coordination Act; Endangered Species Act; Marine Mammals Protection Act)
- U.S. Army Corps of Engineers (Clean Water Act Section 404; Marine Protection, Research and Sanctuaries Act Sections 102 and 103; Rivers and Harbors Act)
- U.S. Environmental Protection Agency (Clean Water Act Section 404; Marine Protection, Research and Sanctuaries Act Sections 102 and 103)
- U.S. Fish and Wildlife Service (Fish and Wildlife Coordination Act, Endangered Species Act)
- California Department of Fish and Game (California Fish and Game Code; several other State and federal statutes)
- San Francisco Bay Conservation and Development Commission (McAteer-Petris Act; Suisun Marsh Preservation Act; Coastal Zone Management Act)
- State Water Resources Control Board and Regional Water Quality Control Boards (Clean Water Act Section 401; Porter-Cologne Water Quality Control Act)
- State Lands Commission (Public Resources Code; several State and federal statutes)

While the proposed dredge activity is common to all options, the disposal and/or reuse options are subject to different types of review, and as detailed below, each option must show compliance with different statutory and regulatory requirements.

Federal Water Pollution Control Act of Clean Water Act (FCWA)

The COE will apply 401 certification requirements to its permits under Section 404 of FCWA. Compliance with FCWA Section 404(b)(1) guidelines will be required from all options considered, except for ocean and upland disposal. Section 401 of FCWA requires that an applicant for a federal license or permit provide a certification that any discharges from the proposed activity will comply with FCWA, including water quality requirements.

Marine Protection, Research and Sanctuaries Act (MPRSA)

Requirements under Sections 102 and 103 would apply only to the ocean disposal options. Site SF-DODS is designated by EPA under Section 102. The COE will require compliance with procedures and criteria established in Title 40 of the CFR, Subchapter H, Parts 220 through 229.

Porter-Cologne Act

Requirements under the Porter-Cologne Act will apply only to waste discharges to land for upland and wetland reuse alternatives.

Rivers and Harbors Act of 1899

The COE is required by Section 10 of the Rivers and Harbors Act to authorize certain structures or work in or affecting navigable waters of the United States. This will apply to in-Bay disposal as well as to the dredging activity itself. The Coast Guard takes jurisdiction for the construction and demolition of bridges under the General Bridges Act and the Rivers and Harbors Act to grant a Section 9 permit.

Coastal Zone Management Act (CZMA)

The CZMA requires the COE to coordinate permit review with State level coastal zone review agencies. In the case of the East Span Project, BCDC will need to make a consistency determination on the project as a whole, including in-Bay disposal. Wetland reuse sites will need to be certified in order to accept material from SFOBB or any other source.

California Public Resources Code

The California Public Resources Code requires that anyone proposing to dredge submerged lands under the jurisdiction of the State Lands Commission obtain a dredging lease from the State Lands Commission. The State Lands Commission has given jurisdiction of lands that would be dredged for the East Span Project to the Ports of Oakland and San Francisco.

The specific requirements of the different options are summarized in Table 6-2.

Results of the Sediment Analysis Program

Following the results of the sediment testing program, DMMO will determine suitability of the dredged material for aquatic disposal. This factor will be used by Caltrans to propose reuse/disposal options, and to determine the appropriate destination for the different volumes of material, and indicate the most effective combination of sites to accommodate the material.

Table 6.2

Applicability of Regulatory Requirements to Dredge, Disposal, and Reuse Options

Option/ Requirement	Section 404	Section 401	MPRSA	CZMA	Porter Cologne Act	Public Resources Code
Dredge	404(b)(1) Guideline compliance required of applicant	Certification required of applicant	N/A	BCDC consistency required of applicant	N/A	State Lands Commission lease/Determination required of applicant
In-Bay Disposal	404(b)(1) Guideline compliance required of applicant	Certification	N/A	BCDC consistency required of applicant	N/A	N/A
Ocean Disposal	N/A	N/A	Section 103 compliance required of applicant	N/A	N/A	N/A
Sidecasting	404(b)(1) Guideline compliance required of applicant	Certification required of applicant	N/A	BCDC consistency required of applicant	N/A	N/A
UWR	Guideline compliance/ permit required of site operator	Certification required of site operator	N/A	Site certification required of operator	Discharge permit required of applicant if dewatering	N/A
Upland Landfills	Guideline compliance/ Permit required of fill operator	Certification required of fill operator	N/A	N/A	Discharge permit required of applicant if dewatering	N/A

Source: URSGWC, 1999.

Cost Summary

Dredging, transportation, and reuse/disposal costs for each potential reuse/disposal site, are summarized in Table 6-3. In general, dredging costs are assumed to be $11.50 per cubic meter ($15.00 per cubic yard) for all the reuse/disposal options except for sidecasting which is estimated at $13.00 per cubic meter ($17.00 per cubic yard) and includes the dredging and "disposal" in one unit cost. These costs are in addition to transportation and disposal costs described earlier in Section 5.

All of the unit costs shown are in first quarter 1999 dollars and include a 25 percent contingency. (See Appendix B for additional cost estimating assumptions.) Permitting fees and testing of the sediments prior to dredging are not included in the unit costs. Costs for dredging of the material are the same for all reuse/disposal options, except for sidecasting which includes dredging and disposal in one unit cost. It should be noted that "dredging" includes typical linear dredging used for creation of the construction and dismantling access channels as well as excavation from pier casings and behind cofferdams for pier construction and dismantling. The latter process can be time consuming and much less cost-efficient than typical linear dredging to deepen a channel.

Table 6-3
Summary of Reuse/Disposal Estimated Costs

REUSE/DISPOSAL OPTION	COST/m^3 (cost/cy)		
	Dredging	Transport and Disposal	Total
SF-11 (Alcatraz)	$11.47 ($15)	$5.35 ($7)	$16.82 ($22)
SF-DODS (Ocean)	$11.47 ($15)	$9.18 ($12)	$20.65 ($27)
Montezuma Wetlands	$11.47 ($15)	$35.17 ($46)	$46.64 ($61)
Hamilton Wetlands	$11.47 ($15)	$17.59 ($23)	$29.06 ($38)
Upland Landfills (Class II - average)	$11.47 ($15)	$59.63 ($78)	$71.11 ($93)
Sidecasting	$13 ($17)	included in dredging cost	$13 ($17)

Source: Parsons Brinckerhoff and URS Greiner Woodward Clyde, 1999.

This final section incorporates the previous information into the recommendation of a reuse/disposal option and its determination as the dredging option.

7.1 COMPARATIVE EVALUATION

Based on the information given in sections 4 through 6, the representative reuse/disposal sites were compared in terms of the decision-making criteria described in Section 6. Table 7-1 summarizes the cross evaluation of sites. Table 7-2 summarizes the cost of disposal of all dredged materials at each representative site, according to suitability of materials. Costs are given for upper and lower limit dredging scenarios. Only upland landfills can accommodate all dredged materials, SUAD and NUAD. The site options for SUAD material are: Alcatraz, Hamilton, SF-DODS, Montezuma, side-casting, or at an upland landfill. NUAD materials may be disposed of at an appropriate upland landfill. Montezuma is also proposing to accept certain NUAD material, though this is currently a subject of controversy for the Montezuma project.

As Table 7-2 shows, Montezuma is the most expensive UWR site option, exceeding the cost of the other UWR site, Hamilton, by over 100 percent. As detailed in Section 4.1, other reuse/disposal sites besides those selected as representative for the DMMP may be considered in the future, particularly other UWR sites that may become available at a later date but in time for use on the East Span Project. New UWR options would be considered during the project implementation, provided their costs are not more than ten percent greater than Hamilton reuse costs and that they meet the criteria used in evaluating Hamilton.

Side-casting presents a probable range of cost from the least expensive site up to costs comparable to disposal at Hamilton, if double handling of material is required. Side-casting may have potential negative impacts. Furthermore, being a non-designated site it is unlikely that side-casting would be granted regulatory approval, unless there is adequate mitigation proposed for lost habitat values.

Montezuma and side-casting will not be evaluated further. Based on the comparative evaluation of representative sites, it appears that no single reuse/disposal option is adequate or preferred for all the dredged material generated throughout the East Span Project. Only the landfill option could accommodate all the dredge material (both NUAD and SUAD). Combinations of sites, including landfill and one to three other reuse/disposal sites, are presented in Section 7-2.

It should be noted that while combined reuse/disposal options generally present the best balance between environmental concerns and costs, project timing and logistics must also be considered. In the event that no in-bay disposal, ocean disposal, or upland wetland reuse sites are available or approved for use in time to accept dredged materials from the project (according to the proposed East Span Project schedule), Caltrans would opt to place all dredged material from the project at landfill sites. Further, if during the life of the project options other than the representative sites analyzed in this document become available, meet the screening criteria, and are cost-effective for the contractor and Caltrans, the contractor may choose to reuse/dispose of materials at such sites.

Table 7-1

Comparative Evaluation of Reuse/Disposal Sites According to Decision-Making Criteria

REUSE/DISPOSAL SITE	CRITERIA						
	Availability / Reliability	**Capacity to Meet Project Schedule**	**Consistency with LTMS[1]**	**Permitting Requirements[2]**	**Acceptable Sediments**	**Impacts**	**Total Cost per m^3 (per cy)**
In-Bay (Alcatraz SF-11)	OK	Uncertain due to first come-first served policy and seasonal restrictions	Uncertain due to DMMO policy on "new work"	Secured by applicant (CWA 404, 401; CZMA)	SUAD	Not significant[4]	$5.3 ($7)
Ocean (SF-DODS)	OK	OK	Consistent with LTMS "relief valve"	Secured by applicant (MPRSA 103)	SUAD	Not significant	$9.2 ($12)
Hamilton[6]	Uncertain; depends on permitting and funding	Uncertain due to logistics of daily volumes	Consistent with LTMS goal for UWR expansion	Secured by site operator	Wetland cover	Beneficial	$17.6 ($23)
Montezuma[6]	Uncertain; depends on permitting and funding	Uncertain due to logistics of daily volumes	Consistent with LTMS goal for UWR expansion	Secured by site operator	Cover/non-cover	Beneficial	$35.2 ($46)
Sidecasting	Depends on likelihood of permit	OK	Inconsistent; disposal to non-designated site	Secured by applicant (404, 401, CZMA, SLC)	SUAD	Adverse	$1.52 ($2)[5]
Upland Landfills	OK	OK	Consistent for NUAD materials and for clean material used as capping	Secured by site operator	SUAD and NUAD	Not significant; beneficial for clean cover	$59.6 ($78)

1) LTMS goals refer to overall disposal from all dredgers, not individual projects.
2) Assumes permitting for disposal only. Permitting for all dredging operation alternatives will be similar.
3) Cost of transport, handling and disposal.
4) Disposal will be within volume and frequency restrictions for the permitted sites and pose no significant impacts.
5) Could be as high as $36/cy if double handling of material is required.
6) Hamilton and Montezuma are representative UWR sites and define a potentially acceptable range of availability effects and costs considerations for potential UWR sites.
Source: URSGWC, April 1999

Table 7-2
Upper and Lower Limit Dredging Disposal Costs for Individual Site Options[1]

Disposal/Reuse Site	Alcatraz	Hamilton	SF-DODS	Montezuma	Sidecasting	Landfill
Costs for Upper Limit Dredging Disposal (x1000)	$3,081	$10,123	$5,281	$20,426	$880	$45,665
Costs for Lower Limit Dredging Disposal (x1000)	$2,042	$8,060	$4,205	$16,119	$701	$27,903

1) Disposal volumes according to SUAD and NUAD distribution to aquatic/wetland site and landfill, respectively.

Source: Parsons Brinkerhoff, April 1999.

7.2 PROPOSED COMBINED REUSE/DISPOSAL SITE OPTIONS

The project will generate varying quantities of dredged material of different quality throughout the project construction timeline (see discussion in Section 3 and Figures 3-7 and 3-8). The majority of the material will come from dredging of the construction and dismantling access channels. Smaller amounts (approximately 1,500 m^3 [2,000 cy] per month) will be generated during construction of new piers and dismantling existing piers. The dredged material disposal sites will need to accommodate dredged material in a manner that satisfies three factors:

- Adequate volume capacity
- Suitability of the site for the proposed material
- Logistics of dredging, transport, and disposal of the materials

Based on the above, seven combined site options, A through G, have been developed to accommodate the materials from construction access, construction piers, dismantling access and dismantling piers. The options are presented in Tables 7-3 and 7-4 for the upper and lower limit dredging, respectively. All NUAD material is allocated to upland landfill. Option A is the preferred option. The others are in no particular order of preference. The seven combined-site options present different allocations of SUAD material to Hamilton (or similar UWR site), Alcatraz, and or SF-DODS, as follows:

- Option A: construction and dismantling access dredging material is allocated to Hamilton, and a small amount of dredged material per month from construction and dismantling piers is allocated to Alcatraz.
- Option B: construction and dismantling access dredging material is allocated to SF-DODS, and a small amount of dredged material per month from construction of new piers and dismantling of existing piers is allocated to Alcatraz.
- Option C: SUAD material is allocated entirely to SF-DODS.
- Option D: construction and dismantling access dredging material is allocated to Hamilton, and a small amount of dredged material per month from construction and dismantling piers is allocated to SF-DODS.
- Option E: SUAD material is allocated entirely to Hamilton.
- Option F: construction access dredging material is allocated to SF-DODS, dismantling access dredging material is allocated to Hamilton, and a small amount of dredged material per month from construction and dismantling piers is allocated to Alcatraz.
- Option G: construction access dredging material is allocated to SF-DODS, and all other SUAD material from dismantling access and the piers is allocated to Hamilton.

Under the upper limit dredging, all options would include about 25 percent of the total volume for upland landfill disposal. Under the lower limit dredging, all options include disposal of two percent of the total volume at an upland landfill. Tables 7-5 and 7-6 indicate the percentage of SUAD material allocated to each disposal/reuse site under each option for upper limit and lower limit dredging, respectively. The costs associated with each combined option are also given on

Tables 7-5 and 7-6. For both upper and lower limit dredging, Option E (placing all SUAD material at Hamilton) is the most expensive option, and Option B (placing SUAD material at SF-DODS and Alcatraz) is the least expensive option.

7.2.1 Air Quality Emissions Comparison of Combined Reuse/Disposal Options

Air quality emissions were calculated for the seven combined reuse/disposal options discussed in Section 7.2. In addition, another option that would send all dredged material to the Altamont Landfill was considered and is called Option H is this section. A technical memorandum discussing the analysis in further detail, including methodology and results, is presented in Appendix C. The analysis used dredge quantities for Alternative N-6 for analysis purposes.

It should be noted that the FHWA has concluded that the East Span Project is subject to the Transportation Conformity rule and thus does not require a Clean Air Act General Conformity assessment. Project conformity under the Transportation Conformity rule is addressed in Section 4.4.3 of the DEIS. The U.S. Army Corps of Engineers may address general conformity in its subsequent NEPA document for the Project's Section 404 permit.

The emission inventory consists of activities related to dredging, transport of dredged materials to the disposal sites, and unloading/loading of the material. Emissions were calculated for total organic gases (TOG), reactive organic gases (ROG), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), and particulate matter (both total PM and PM_{10}).

Since the volume of dredging would vary greatly over the total construction period, emissions on a daily basis were not calculated for an average construction day. Instead, emissions were calculated for a maximum daily scenario. First, it was determined, based on dredge quantities, that a maximum day would occur during the preparation of an access channel for construction of the new bridge. During this phase of construction, depending on which combined reuse/disposal option is chosen, dredged material may be taken to the Hamilton Wetlands Restoration site and the Altamont Landfill (Options A, D, and E), to the ocean disposal site and the Altamont Landfill (Options B, C, F, and G), or just to the Altamont Landfill (Option H).

Based on the level of activity required for each of these options, it was determined that a maximum daily scenario would likely occur during a situation where dredged material would be taken to both the ocean disposal site and the Altamont Landfill on particular day. It was estimated that during this maximum daily scenario, there would be between 0.2 and 0.4 metric tons (0.2 and 0.4 tons) of TOG, ROG, SO_2, and particulate matter, 0.8 metric tons (0.9 tons) of CO, and 3.4 metric tons (3.8 tons) of NO_x.

Table 7-7 summarizes the total amount of air pollutant emissions that would be generated over the whole construction period for each option, using the upper dredging limit. Table 7-8 presents the same information, but for the lower dredging limit. Construction with the lower dredging limit would result in approximately 30 to 42 percent lower emissions than construction with the upper dredging limit, depending upon the reuse/disposal option.

The option that would generate the greatest amount of emissions would be Option C because under this scenario all dredged material suitable for unconfined aquatic disposal would be transported to the ocean disposal site. The tug boats used to take dredged material to the ocean disposal site would generate the greatest amount of emissions of any of the equipment potentially

used during transport of material. As a result, options with less ocean disposal would lower emissions.

Options A, E, and H generate the lowest levels of emissions among the eight scenarios evaluated. The option generating the least emissions overall would be Option H (all material transported to

Table 7-3

Upper Limit Dredging Proposed Combined Reuse/Disposal Options[1]

	Dredged Material Quality[2]	Dredged Material Quantity m^3 (cy)	Option A	Option B	Option C	Option D	Option E	Option F	Option G
Construction Access	SUAD	172,782 (225,977)	Hamilton	SF-DODS	SF-DODS	Hamilton	Hamilton	SF-DODS	SF-DODS
	NUAD	108,576 (142,004)	Landfill	Landfill	Landfill	Landfill	Landfill	Landfill	Landfill
Construction Piers	SUAD	31,919 (41,747)	Alcatraz	Alcatraz	SF-DODS	SF-DODS	Hamilton	Alcatraz	Hamilton
	NUAD	2,544 (3,328)	Landfill	Landfill	Landfill	Landfill	Landfill	Landfill	Landfill
Dismantling Access	SUAD	115,955 (151,654)	Hamilton	SF-DODS	SF-DODS	Hamilton	Hamilton	Hamilton	Hamilton
Dismantling Piers	SUAD	15,792 (20,654)	Alcatraz	Alcatraz	SF-DODS	SF-DODS	Hamilton	Alcatraz	Hamilton

1) Site allocation reflects logistics and assumed material suitability. Amounts may change based on actual sediment testing results.
2) Assumptions to be verified by sampling and analysis.
Source: URSGWC, 1999.

Table 7-4

Lower Limit Dredging Proposed Combined Reuse/Dispoal Site Options[1]

	Dredged Material Quality[2]	Dredged Material Quantity m^3 (cy)	Option A	Option B	Option C	Option D	Option E	Option F	Option G
Construction Access	SUAD	103,520 (135,391)	Hamilton	SF-DODS	SF-DODS	Hamilton	Hamilton	SF-DODS	SF-DODS
Construction Piers	SUAD	32,595 (42,631)	Alcatraz	Alcatraz	SF-DODS	SF-DODS	Hamilton	Alcatraz	Hamilton
	NUAD	5,588 (7,308)	Landfill	Landfill	Landfill	Landfill	Landfill	Landfill	Landfill
Dismantling Access	SUAD	115,955 (151,654)	Hamilton	SF-DODS	SF-DODS	Hamilton	Hamilton	Hamilton	Hamilton
Dismantling Piers	SUAD	4,592 (6,006)	Alcatraz	Alcatraz	SF-DODS	SF-DODS	Hamilton	Alcatraz	Hamilton

1) Site allocation reflects logistics and assumed material suitability. Amounts may change based on actual sediment testing results.
2) Assumptions to be verified by sampling and analysis.
Source: URSGWC, 1999.

Table 7-5

Upper Limit Dredging Proposed Combined Reuse/Disposal Options - Percentage of SUAD Volume Placed at Each Site and Total Cost[1]

Option	SF-DODS	Hamilton	Alcatraz	Cost (x $1000)
A	--	86	14	$20,458
B	86	--	14	$16,304
C	100	--	--	$16,617
D	14	86	--	$20,771
E	--	100	--	$21,459
F	52	34	14	$17,971
G	52	48	--	$18,970

1) Includes landfill disposal costs for NUAD portion.

Source: URSGWC, 1999.

Table 7-6

Lower Limit Dredging Proposed Combined Reuse/Disposal Site Options
Percentage of the SUAD Volume Placed at Each Site and Total Cost[1]

Option	SF-DODS	Hamilton	Alcatraz	Cost (x $1000)
A	--	85.5	14.5	$7,512
B	85	--	14.5	$4,355
C	100	--	--	$4,600
D	14.5	85.5	--	$7,862
E	--	100	--	$8,396
F	40.5	45	14.5	$6,023
G	40.5	59.5	--	$6,801

1) Includes landfill disposal costs for NUAD portion.

Source: URSGWC, 1999.

Table 7-7

Total Air Quality Emissions by Option for the Upper Dredging Limit (in metric tons [tons])

Option	Total Emissions (metric tons[tons])						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
A	19 (21)	18 (20)	66 (73)	249 (273)	16 (18)	13 (14)	11 (12)
B	22 (24)	21 (23)	67 (74)	264 (291)	17 (19)	15 (17)	14 (15)
C	23 (25)	22 (24)	68 (75)	272 (299)	18 (20)	16 (17)	14 (16)
D	20 (22)	19 (21)	68 (75)	258 (284)	17 (18)	14 (15)	12 (13)
E	19 (21)	18 (20)	68 (74)	254 (279)	16 (18)	13 (14)	11 (13)
F	21 (23)	20 (22)	67 (73)	258 (284)	17 (18)	14 (16)	13 (14)
G	21 (23)	20 (22)	67 (74)	259 (285)	17 (19)	14 (16)	13 (14)
H (all landfill disposal)	19 (21)	18 (20)	89 (98)	235 (258)	13 (14)	13 (14)	12 (13)

Source: Parsons Brinckerhoff, 1999.

Table 7-8

Total Air Quality Emissions by Option for the Lower Dredging Limit (in metric tons[tons])

Option	Total Emissions (metric tons [tons])						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
A	12 (13)	12 (13)	41 (45)	158 (174)	10 (11)	8 (9)	7 (8)
B	15 (16)	14 (16)	41 (45)	170 (187)	11 (12)	10 (11)	9 (10)
C	15 (17)	15 (16)	42 (46)	176 (194)	12 (13)	11 (12)	10 (11)
D	13 (14)	12 (14)	42 (46)	165 (182)	11 (12)	9 (10)	8 (9)
E	12 (14)	12 (13)	42 (46)	162 (179)	11 (12)	9 (9)	8 (8)
F	13 (15)	13 (14)	41 (45)	164 (180)	11 (12)	9 (10)	8 (9)
G	13 (15)	13 (14)	41 (45)	164 (180)	11 (12)	9 (10)	8 (9)
H (all landfill disposal)	11 (12)	11 12)	52 (57)	137 (151)	8 (8)	8 (8)	7 (7)

Source: Parsons Brinckerhoff, 1999.

the Altamont Landfill). Options A and E would generate lower emissions of certain pollutants (CO, organcis, and PM10) compared to Option H. Option H, which would require double-handling of material and trucking to a landfill, would generate the least amounts of NOx and SO2, and would have levels of organics and particulates similar to the other options. The lower levels of emissions generated by Option H would occur because the trucks and material handling equipment used with this option generate lower levels of pollutants than the tug boats used with the other options. However, motor vehicles, including heavy-duty diesel trucks, generate more CO as a result of incomplete fuel combustion.

7.3 PREFERRED OPTION AND CONTINGENCIES

The preferred reuse/disposal option can be derived from among the seven options identified above by selecting the optimal solution to the following objectives: maximization of UWR as a commitment to the LTMS goals, while minimizing costs, and facilitating project logistics. On the basis of the information available to date, the preferred disposal option is A. Option A involves reuse/disposal of construction and dismantling access dredging materials at Hamilton (or a comparable UWR site), corresponding to 86 percent of the SUAD material or 65 percent of the total for the upper limit dredging, and to 85.5 of the SUAD material or 80.3 percent of the total dredged material for the lower limit dredging. Option A also involves disposal of construction and pier dismantling dredging material at Alcatraz, corresponding to 14 percent of the SUAD material or to 11 of the total dredged volume for the upper limit dredging, and 14.5 percent of the SUAD material or 17.7 percent of the total dredged material for the lower limit dredging. By disposing of the piers' dredging at the Alcatraz site, Option A reduces the distance of barge trips carrying low volumes, easing project logistics and achieving a reduction in costs.

Should the approval of the Hamilton site (or comparable UWR site) be delayed past the initiation of the dredging activities, the following options may be noted as contingencies: Option F and Option G can allow for disposal of material dredged during the early part of the project at SF-DODS. Materials dredged at a later date can be reused/disposed of at Hamilton (or similar site) as soon as the site is operational.

In addition, other upland/wetland reuse sites that are not currently available may become operational during the schedule of dredging activities. New sites may substitute for Hamilton to maintain the commitment to UWR expressed in this DMMP, provided that the transportation and disposal costs at the potential new site do not exceed those of Hamilton by more than ten percent. As mentioned previously, if no sites (in-Bay, ocean, or UWR) are available or approved for use in time, Caltrans may opt to place all materials at landfill sites in order to maintain the East Span Project schedule.

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SFOBB Project
Dredging Quantities

Based on N6 Alternative

by BLN 1/15/99
checked by GVL

Estimated Dredge Quantities (cubic meters)							
	Dredged Material to Construct New Piers and Footings		Dredge Material from Construction Access to Construct New Bridge		Dredge Material from Removal of Existing Bridge Piers to Mudline	Dredge Material from Construction Access to Dismantle Existing Bridge	Total (cubic meters)
	SUAD	NUAD	SUAD	NUAD		SUAD	
Lower Limit	32,257	5,587	103,520	0	4,592	115,955	**261,911**
Upper Limit	31,919	2,545	172,782	108,576	15,792	115,955	**447,568**

Assumptions:

Lower Limit-Pier Dredging

Dredging in the Coffer Dam only occurs if bottom of pile cap is below bay mud.
Depth of dredging for the Piles is the depth of structural concrete minus depth of water.
Width of coffer dam is 2 m beyond width of pile cap.
Piers E22 through E29 assumed to contain contaminated material.
Mud depth at E1 is 3 m above rock layer.

Lower Limit-Access Dredging

Dredging width is 115 m.
Dredging depth required is -4.3 m below MSL.
1:3 side slopes used.
Limits of Dredging is sta 73+80 to 83+40.
A trestle would be used from 83+40 to Oakland shore.

Lower Limit - Demolition of Existing Piers

Width of coffer dam is 2 m beyond width of pile cap.
A depth of 1 m will be dredged around existing footings.

Lower Limit - Demolition Access Dredging

Dredging width is 110 m.
Dredging depth required is -4.3 m below MSL.
1:3 side slopes used.
Limits of Dredging is sta 73+80 to 82+60.

Upper Limit - Pier Dredging

Dredging in the Coffer Dam only occurs if bottom of pile cap is below bay mud.
Depth of dredging for the Piles is the depth of structural concrete minus depth of water.
Width of coffer dam is 6 m beyond width of pile cap.
Piers E22 through E29 assumed to contain contaminated material.
Mud depth at E1 is 3 m above rock layer.

Upper Limit-Access Dredging

Dredging width is 115 m.
Dredging depth required is -4.3 m below MSL.
1:3 side slopes used.
Limits of Dredging is sta 73+80 to 88+12.
In the condition of the upper-limit dredging, no new pier coffer dam dredging required.

Upper Limit - Demolition of Existing Piers

Width of coffer dam is 6 m beyond width of pile cap.
A depth of 1 m will be dredged around existing footings.

Upper Limit - Demolition Access Dredging

Dredging width is 110 m.
Dredging depth required is -4.3 m below MSL.
1:3 side slopes used.
Limits of Dredging is sta 73+80 to 82+60.

Pier Dredge Volumes - without Coffer Dams
(used with upper limit dredging.)

Pier	Pile Cap				Coffer dam				Piles						Total Dredge Volume			Comments
	wdth	lngth	depth		wdth	lngth	depth	vol	dia	#	length				volume	EB	WB	both	
			total	water			water dredge				water	conc	**dredge**	total					
E1									2.5	20	15	50	3	78	**295**			**295**	
E2									2.5	16	12.8	50	37.2	78	**2,922**			**2,922**	
E3	13.8	20	6	4					2.5	6	12.4	50	37.6	78	**1,107**	1,107	1,107	**2,215**	
E4	13.8	20	6	4					2.5	6	12	50	38	78	**1,119**	1,119	1,119	**2,238**	
E5	13.8	20	6	4					2.5	6	9.4	50	40.6	78	**1,196**	1,196	1,196	**2,392**	
E6	13.8	20	6	4					2.5	6	7.5	50	42.5	78	**1,252**	1,252	1,252	**2,503**	
E7	13.8	20	6	4					2.5	6	5.9	50	44.1	78	**1,299**	1,299	1,299	**2,598**	
E8	13.8	20	6	4					2.5	6	4.8	50	45.2	78	**1,331**	1,331	1,331	**2,663**	
E9	13.8	20	6	4					2.5	6	4.3	50	45.7	78	**1,346**	1,346	1,346	**2,692**	
E10	13.8	20	6	4					2.5	6	3.9	50	46.1	78	**1,358**	1,358	1,358	**2,716**	
E11	13.8	13.8	4	2					1.5	9	3.7	50	46.3	97	**736**	736	736	**1,473**	
E12	13.8	13.8	4	2					1.5	9	3.7	50	46.3	97	**736**	736	736	**1,473**	
E13	13.8	13.8	4	2					1.5	9	3.3	50	46.7	97	**743**	743	743	**1,485**	

E14	13.8	13.8	4	2		1.5	9	3	50	47	97	**748**	748	748	**1,495**		
E15	9	9	3.5	1.5		1	9	3	30	27	98	**191**	191	191	**382**		
E16	9	9	3.5	1.5		1	9	3	30	27	98	**191**	191	191	**382**		
E17	9	9	3.5	1.5		1	9	2.9	30	27.1	98	**192**	192	192	**383**		
E18	9	9	3.5	1.5		1	9	2.1	30	27.9	98	**197**	197	197	**394**		
E19	9	9	3.5	1.5		1	9	1.7	30	28.3	98	**200**	200	200	**400**		
E20	9	9	3.5	1.5		1	9	1.2	30	28.8	98	**204**	204	204	**407**		
E21	9	9	3.5	1.5		1	9	0.8	30	29.2	98	**206**	206	206	**413**		
														Total	**31,919**		

Contaminated Pier Dredge Volumes -without coffer dams

Pier	**Pile Cap**					**Coffer dam**					**Piles**						**Total Dredge Volume**			
	wdth	lngth	depth total	water		wdth	lngth	depth water	depth dredge	vol	dia	#	water	length conc	length **dredge**	length total	volume	EB	WB	**both**	Comments
E22	9	9	3.5	1.5							1	9	0	30	30	98	**212**	212	212	**424**	contaminated
E23	9	9	3.5	1.5							1	9	0	30	30	98	**212**	212	212	**424**	contaminated
E24	9	9	3.5	1.5																	on land
E25	9	9	3.5	1.5																	on land
E26	9	9	3.5	1.5							1	9	0	30	30	98	**212**	212	212	**424**	contaminated

E27	9	9	3.5	1.5		1	9	0	30	30	98	**212**	212	212	**424**	contaminated
E28	9	9	3.5	1.5		1	9	0	30	30	98	**212**	212	212	**424**	contaminated
E29	9	9	3.5	1.5		1	9	0	30	30	98	**212**	212	212	**424**	contaminated
														Total	**2,545**	

Demolition Access Dredging

Station	depth required	water depth	dredge depth	width	length	area	volume
73+80	4.3	4	0.3	110		33.3	
					20		778
74+00	4.3	3.9	0.4	110		44.5	
					100		3,888
75+00	4.3	4	0.3	110		33.3	
					100		3,327
76+00	4.3	4	0.3	110		33.3	
					100		3,327
77+00	4.3	4	0.3	110		33.3	
					100		4,451
78+00	4.3	3.8	0.5	110		55.8	
					100		9,019
79+00	4.3	3.2	1.1	110		124.6	
					100		13,635
80+00	4.3	3	1.3	110		148.1	
					100		20,230
81+00	4.3	2.1	2.2	110		256.5	
					100		31,962
82+00	4.3	1.1	3.2	110		382.7	
					61		25,339
82+61	4.3	0.6	3.7	110		448.1	
						Total	**115,955**

Demolition - Existing Piers - Lower Limit

Pier	Pile Cap			Coffer dam					
	width	length	area	width	length	dredge depth	area	area diff	vol
E2	13	37	481	17	41	1	697	216	**216**
E3	24	41	984	28	45	1	1260	276	**276**
E4	19	28	532	23	32	1	736	204	**204**
E5	19	28	532	23	32	1	736	204	**204**
E6	21	39	819	25	43	1	1075	256	**256**
E7	21	39	819	25	43	1	1075	256	**256**
E8	21	39	819	25	43	1	1075	256	**256**
E9	31	31	961	35	35	1	1225	264	**264**
E10	13	34	442	17	38	1	646	204	**204**
E11	13	34	442	17	38	1	646	204	**204**
E12	13	34	442	17	38	1	646	204	**204**
E13	13	33	429	17	37	1	629	200	**200**
E14	13	33	429	17	37	1	629	200	**200**
E15	13	33	429	17	37	1	629	200	**200**
E16	13	33	429	17	37	1	629	200	**200**
E17	15	33	495	19	37	1	703	208	**208**
E18	15	33	495	19	37	1	703	208	**208**
E19	15	33	495	19	37	1	703	208	**208**
E20	15	33	495	19	37	1	703	208	**208**
E21	15	33	495	19	37	1	703	208	**208**
E22	15	33	495	19	37	1	703	208	**208**

Total **4,592**

Demolition - Existing Piers - Upper Limit

Pier	Pile Cap			Coffer dam					
	width	length	area	width	length	dredge depth	area	area diff	vol
E2	13	37	481	25	49	1	1225	744	**744**
E3	24	41	984	36	53	1	1908	924	**924**
E4	19	28	532	31	40	1	1240	708	**708**
E5	19	28	532	31	40	1	1240	708	**708**
E6	21	39	819	33	51	1	1683	864	**864**
E7	21	39	819	33	51	1	1683	864	**864**
E8	21	39	819	33	51	1	1683	864	**864**
E9	31	31	961	43	43	1	1849	888	**888**
E10	13	34	442	25	46	1	1150	708	**708**
E11	13	34	442	25	46	1	1150	708	**708**
E12	13	34	442	25	46	1	1150	708	**708**
E13	13	33	429	25	45	1	1125	696	**696**
E14	13	33	429	25	45	1	1125	696	**696**
E15	13	33	429	25	45	1	1125	696	**696**
E16	13	33	429	25	45	1	1125	696	**696**
E17	15	33	495	27	45	1	1215	720	**720**
E18	15	33	495	27	45	1	1215	720	**720**
E19	15	33	495	27	45	1	1215	720	**720**
E20	15	33	495	27	45	1	1215	720	**720**
E21	15	33	495	27	45	1	1215	720	**720**

E22	15	33	495		27	45	1	1215	720	**720**
									Total	**15,792**

Access Dredging - Lower Level

Station	depth required	water depth	dredge depth	width	length	area	volume
73+80	4.3	4.0	0.3	115		34.8	
					120		5,581
75+00	4.3	3.8	0.5	115		58.3	
					100		5,825
76+00	4.3	3.8	0.5	115		58.3	
					100		6,417
77+00	4.3	3.7	0.6	115		70.1	
					100		8,200
78+00	4.3	3.5	0.8	115		93.9	
					100		11,203
79+00	4.3	3.2	1.1	115		130.1	
					100		14,235
80+00	4.3	3.0	1.3	115		154.6	
					100		15,457
81+00	4.3	3.0	1.3	115		154.6	
					100		15,457
82+00	4.3	3.0	1.3	115		154.6	
					100		17,313
83+00	4.3	2.7	1.6	115		191.7	
					40		3,834
83+40	4.3	2.2	2.1	115			
						Total	**103,520**

Access Dredging - Upper Level - Clean

Station	depth required	water depth	dredge depth	width	length	area	volume
73+80	4.3	4.4	-0.1	115			
					20		348
74+00	4.3	4.0	0.3	115		34.8	
					100		4,651
75+00	4.3	3.8	0.5	115		58.3	

					100		5,825
76+00	4.3	3.8	0.5	115		58.3	
					100		6,417
77+00	4.3	3.7	0.6	115		70.1	
					100		8,200
78+00	4.3	3.5	0.8	115		93.9	
					100		11,203
79+00	4.3	3.2	1.1	115		130.1	
					100		14,235
80+00	4.3	3.0	1.3	115		154.6	
					100		15,457
81+00	4.3	3.0	1.3	115		154.6	
					100		15,457
82+00	4.3	3.0	1.3	115		154.6	
					100		17,313
83+00	4.3	2.7	1.6	115		191.7	
					40		8,928
83+40	4.3	2.2	2.1	115		254.7	
					80		30,509
84+20	4.3	0.3	4.0	115		508.0	
					80		34,240
85+00	4.3	0.3	4.0	75		348.0	
					Total		**172,782**

Access Dredging - Upper Level - Contaminated

85+00	4.3	0.3	4.0	75		348.0	
					312		108,576
88+12	4.3	0.3	4.0	75		348.0	
					Total		**108,576**

Pier Dredge Volumes - Lower Limit

Pier	Pile Cap				Coffer dam				Piles						Total Dredge Volume			Comments
	wdth	lngth	depth total	depth water	wdth	lngth	depth water	vol dredge	dia	#	length water	length conc	length **dredge**	length total	volume	EB	WB	**both**	
E1									2.5	20	15	50	3	78	**295**			**295**	
E2									2.5	16	12.8	50	37.2	78	**2,922**			**2,922**	
E3	13.8	20	6	4					2.5	6	12.4	50	37.6	78	**1,107**	1,107	1,107	**2,215**	
E4	13.8	20	6	4					2.5	6	12	50	38	78	**1,119**	1,119	1,119	**2,238**	
E5	13.8	20	6	4					2.5	6	9.4	50	40.6	78	**1,196**	1,196	1,196	**2,392**	
E6	13.8	20	6	4					2.5	6	7.5	50	42.5	78	**1,252**	1,252	1,252	**2,503**	
E7	13.8	20	6	4					2.5	6	5.9	50	44.1	78	**1,299**	1,299	1,299	**2,598**	
E8	13.8	20	6	4					2.5	6	4.8	50	45.2	78	**1,331**	1,331	1,331	**2,663**	
E9	13.8	20	6	4					2.5	6	4.3	50	45.7	78	**1,346**	1,346	1,346	**2,692**	
E10	13.8	20	6	4					2.5	6	3.9	50	46.1	78	**1,358**	1,358	1,358	**2,716**	
E11	13.8	14	4	2					1.5	9	3.7	50	46.3	97	**736**	736	736	**1,473**	
E12	13.8	14	4	2					1.5	9	3.7	50	46.3	97	**736**	736	736	**1,473**	
E13	13.8	14	4	2					1.5	9	3.3	50	46.7	97	**743**	743	743	**1,485**	
E14	13.8	14	4	2					1.5	9	3	50	47	97	**748**	748	748	**1,495**	

Pier	Pile Cap				Coffer dam					Piles							Total Dredge Volume			Comments
	wdth	lngth	depth		wdth	lngth	depth		vol	dia	#		length			volume	EB	WB	both	
E15	9	9	3.5	1.5						1	9	3	30	27	98	**191**	191	191	**382**	
E16	9	9	3.5	1.5						1	9	3	30	27	98	**191**	191	191	**382**	
E17	9	9	3.5	1.5						1	9	2.9	30	27.1	98	**192**	192	192	**383**	
E18	9	9	3.5	1.5						1	9	2.1	30	27.9	98	**197**	197	197	**394**	
E19	9	9	3.5	1.5						1	9	1.7	30	28.3	98	**200**	200	200	**400**	
E20	9	9	3.5	1.5	13	13	1.2	0.3	**51**	1	9	1.2	30	28.8	98	**204**	254	254	**509**	
E21	9	9	3.5	1.5	13	13	0.8	0.7	**118**	1	9	0.8	30	29.2	98	**206**	325	325	**649**	
																		Total	**32,257**	

Contaminated Pier Dredge Volumes - Lower Limit

Pier	Pile Cap				Coffer dam					Piles							Total Dredge Volume			Comments
	wdth	lngth	depth		wdth	lngth	depth		vol	dia	#		length			volume	EB	WB	both	
			total	water			water	dredge				water	conc	**dredge**	total					
E22	9	9	3.5	1.5	13	13	0	1.5	**254**	1	9	0	30	30	98	**212**	466	466	**931**	contaminated
E23	9	9	3.5	1.5	13	13	0	1.5	**254**	1	9	0	30	30	98	**212**	466	466	**931**	contaminated
E24	9	9	3.5	1.5																on land
E25	9	9	3.5	1.5																on land
E26	9	9	3.5	1.5	13	13	0	1.5	**254**	1	9	0	30	30	98	**212**	466	466	**931**	contaminated
E27	9	9	3.5	1.5	13	13	0	1.5	**254**	1	9	0	30	30	98	**212**	466	466	**931**	contaminated

Pier	Pile Cap				Coffer dam					Piles						Total Dredge Volume			Comments
	wdth	lngth	depth		wdth	lngth	depth	vol	dia	#		length			volume	EB	WB	both	
E28	9	9	3.5	1.5	13	13	0	1.5	**254**	1	9	0	30	30	98	**212**	466	466	**931**	contaminated
E29	9	9	3.5	1.5	13	13	0	1.5	**254**	1	9	0	30	30	98	**212**	466	466	**931**	contaminated
																	Total		**5,587**	

Appendix B
Cost Assumptions

SFOBB DREDGE REUSE/DISPOSAL COST ASSUMPTIONS

This section of the report describes the cost assumptions used to derive the dredging, transportation, and reuse/disposal costs associated with the excavation of material for building the SFOBB East Span Seismic Safety Project and for dismantling the existing East Span structure.

SUMMARY

Listed below are the quantities, unit costs, and total costs for each reuse/disposal option. All unit costs are expressed in cubic yards (CY).

	QTY	UOM	Unit Cost	Total Cost
Clean Material				
Sidecast Dredge	276,777	CY	$17.00	$4,705,209
Dredge Material	440,121	CY	15.00	6,601,815
Transport & Reuse/Disposal of Material				
SF-DODS (Ocean)	440,121	CY	12.00	5,281,452
SF-11 (Alcatraz)	440,121	CY	7.00	3,080,847
Montezuma Wetlands	440,121	CY	49.00	21,565,929
Hamilton Wetlands	440,121	CY	23.00	10,122,783
Not Suitable for Unconfined Aquatic Disposal				
Class II Upland Landfill Facility	145,362	CY	78.00	11,338,236

DEFINITIONS

- Barge tow (double screw) - two propeller tug boat
- Scow - vessel used for collected dredged material
- Slick line - transport pipe used for spreading suspended dredge material
- Loose quantity - dredged material that swells once dewatered, typically by 20%

GENERAL ASSUMPTIONS

1. Quantity dredged is assumed to be 440,121 cubic yards of clean sediment, and 145,362 cubic yards of contaminated material. Estimates assume "Upper Limit" design quantities.

2. Costs for dredging of materials are the same for all reuse/disposal costs, except for sidecasting which includes dredging and reuse/disposal in one unit cost.
3. Any additional analytical work (e.g., testing) would be paid for by Caltrans.
4. All estimates are in first quarter 1999 dollars.
5. For reuse/disposal options, assume a 30% subcontractor/general contractor markup.
6. All unit costs include a 25% contingency.
7. Montezuma Wetlands and Hamilton are included to illustrate a range of potential upland wetland restoration (UWR) site costs.

DREDGING ASSUMPTIONS

8. "Dredging" is defined to include typical linear dredging used for creation of construction and dismantling access channels, and excavation from pier casings and behind cofferdams for pier construction and dismantling.
9. Assumes scows are filled to 85% of capacity.
10. Dredging assumes use of the following equipment and activities. The amount of equipment varies among the different reuse/disposal options:
    - Dredge barge for dredging equipment
    - Tug for towing scows
    - Anchor scow to relocate dredge barge
    - Scow for accumulating dredged material
    - Mobilization of equipment
    - All equipment includes labor in accordance with local labor agreements
11. Sidecast dredging:
    - Unit price for sidecast dredge includes slick line pumped method of broadcasting sediment to develop access channel width.
    - Unit price for sidecast dredge material without slick line pump method is $36 per cubic yard. This unit price accounts for doubling handling of dredge material.
12. Unit prices do not include dewatering or treatment of water in cofferdamed excavations.
13. For SF-DODS only, assumes EPA inspection charges shared by other agencies for one year of the two year monitoring/inspection period.
14. Assumes Caltrans to pay permit fees (e.g., lease permit for Port of Oakland facility, etc.).
15. Testing of sediments prior to dredging not included in unit costs.

TRANSPORTATION ASSUMPTIONS

16. Scow rental costs
    - 3,000 cubic yard scow, $600 per day
    - 7,000 cubic yard scow, $700 per day
17. Upland costing assumes that Caltrans would provide a berthing facility (e.g., Caltrans painting warehouse at the Oakland touchdown) suitable for accommodating a dredge scow/dredge barge and up to 10 acres of property for aerating material within one-quarter mile of the facility.
18. Assumes use of 14-wheel trucks; mileage cost is $0.50/mile.

REUSE/DISPOSAL ASSUMPTIONS

19. For upland disposal, estimates assume material would be disposed of at a Class II regulated landfill.

20. Dumping fee for Montezuma Wetlands at $16.00 per cubic yard; fee of $15.00 per cubic yard waived for Hamilton facility.
21. Estimates for Hamilton and Montezuma Wetlands assume dredged material would be off-loaded by slick line pumping.

SOURCES

22. Dutra Construction -- for barge availability and other dredging information
23. Weststar Marine -- for tug/barge costs
24. Local Bay Area Class II landfill operators

REUSE/DISPOSAL OPTION 1 - SF-DODS (OCEAN)

Quantity: 440,121 cubic yards
Loose: 528,145 cubic yards

Item	Quantity	UOM	Unit Cost	Disposal	Transport
2 Scow/Barge Tow (double screw)	1,906	HRS	$1,100	—	$2,096,600
4 Scow (7,000 cubic yard capacity)	193	DAYS	2,800	—	540,400
6 Mobilization of equipment	1	LS	513,369	—	30,722
Subtotal Cost:				0	2,667,722
Subcontractor/General Contractor Markup			30%	0	800,317
Owners Testing					
EPA Inspection Charges	1	YR	770,000	770,000	—
Subtotal Cost:				770,000	3,468,039
Contingency			25%	192,500	867,010
Total Cost:				962,500	4,335,049
Total Cost per Cubic Yard:				$2.19	$9.85

REUSE/DISPOSAL OPTION 2 - SF-11 (ALCATRAZ)

Quantity: 440,121 cubic yards
Loose: 528,145 cubic yards

Item	Quantity	UOM	Unit Cost	Disposal	Transport
1 Barge Tow (single screw)	1,483	HRS	$1,100	—	$1,631,300
2 Scow (3,000 cubic yard capacity)	193	DAYS	1,200	—	231,600
4 Mobilization of equipment	1	LS	88,590	—	88,590
Subtotal Cost:				0	1,951,490
Subcontractor/General Contractor Markup			30%	0	585,447
Subtotal Cost:				0	2,536,937
Contingency			25%	0	634,234
Total Cost:				0	3,171,171
Total Cost per Cubic Yard:				$0	$7.20

REUSE/DISPOSAL OPTION 3 - MONTEZUMA WETLANDS

Quantity: 440,121 cubic yards
Loose: 528,145 cubic yards

Item	Quantity	UOM	Unit Cost	Disposal	Transport
Dredge Non-Contaminated Sediment Material					
2 Barge Tow (double screw)	3,521	HRS	$1,100	—	$3,873,100
6 Scow (3,000 cubic yard capacity)	193	DAYS	3,600	—	694,800
9 Mobilization of equipment	1	LS	319,791	—	319,791
Offload Dredge Material in Slick Line					
Pump Equipment	1	LS	100,000	100,000	—
Pump Mobilization	1	LS	100,000	100,000	—
Pump Labor	2,321	HRS	195	452,518	—
Dump Fee	528,145	CY	16	8,450,321	—
Subtotal Cost:				9,102,839	4,887,691
Subcontractor/General Contractor Markup (Disposal)			30%	2,730,852	—
Subcontractor/General Contractor Markup (Transport) *				10%	— 488,
Subtotal Cost:				11,833,691	5,376,461
Contingency			25%	2,958,423	1,344,115
Total Cost:				14,792,114	6,720,576
Total Cost per Cubic Yard:				$33.61	$15.27

* Accounts for reduced General Contractor coordination in the handling and transportation of the dredged material.

REUSE/DISPOSAL OPTION 4 - HAMILTON WETLANDS

Quantity: 440,121 cubic yards
Loose: 528,145 cubic yards

Item	Quantity	UOM	Unit Cost	Disposal	Transport
Dredge Non-Contaminated Sediment Material					
1 Barge Tow (double screw)	2,201	HRS	$550	—	$1,210,550
4 Scow (3,000 cubic yard capacity)	193	DAYS	2,400	—	463,200
6 Mobilization of equipment	1	LS	28,494	—	28,494
Offload Dredge Material in Slick Line					
Pump Equipment	1	LS	50,000	50,000	—
Pump Mobilization	1	LS	100,000	100,000	—
Pump Labor	2,400	HRS	195	468,000	—
Spread Dumped Material	528,145	CY	8	4,225,160	—
Subtotal Cost:				4,843,160	1,702,244
Subcontractor/General Contractor Markup (Disposal)			30%	1,452,948	—
Subcontractor/General Contractor Markup (Transport) *				10%	— 170,
Subtotal Cost:				6,296,108	1,872,468
Contingency			25%	1,574,027	468,117
Total Cost:				7,870,135	2,340,585
Total Cost per Cubic Yard:				$17.88	$5.32

* Accounts for reduced General Contractor coordination in the handling and transportation of the dredged material.

REUSE/DISPOSAL OPTION 5 - UPLAND DISPOSAL

Quantity: 145,362 cubic yards
Loose: 174,434 cubic yards

Item	Quantity	UOM	Unit Cost	Disposal	Transport
1 Barge Tow (double screw)	403	HRS	$387	—	$155,961
4 Scow (3,000 cubic yard capacity)	101	DAYS	800	—	80,800
6 Mobilization of equipment	1	LS	209,131	—	209,131
Scow/Barge Transport to Berth for Material Offload to Containment					
Barge Tow	8	HRS	1,000	—	8,000
Scow (7,000 cubic yards)	—	DAYS	150	—	Included above
Scow Labor	—	HRS	55	—	Included above
Berthing Facilities					
Berthing Fees	—	LS	20,000	—	By Caltrans
Build Containment Berm					
Build Berm	1,056	CY	2.5	2,640	—
Port of Oakland Facility Lease	1	LS	53,200	53,200	—
Unload Dredge Material to Containment Facility					
Aeration Equipment	2	MONTHS	9,500	19,000	—
Aeration Equipment Idle	3	MONTHS	2,500	7,500	—
Aeration Labor	2,304	HRS	50	115,200	—
Derrick Barge	4,652	DAYS	550	2,558,600	—
Scow (7,000 cubic yard capacity)	291	DAYS	150	43,650	—
Scow Labor	1,163	DAYS	55	63,965	—
Laborers for Cleanup	6,977	HRS	75	523,275	—
Trucking	2,492	HRS	75	186,900	—
Load and Transport Dredge Material to Class II Landfill					
235 Excavator & Operator	872	HRS	228	—	198,816
Trucking	31,149	HRS	75	—	2,336,175
Laborers for Cleanup	1,744	HRS	75	—	130,800
Dump fee	174,434	CY	0	0	—
Decommission Containment Facility					
Demo Berm	1,056	CY	5	5,280	—
Clean up of Port of Oakland Facility	1	LS	5,233	5,233	—
Subtotal Cost:				3,584,443	3,431,173
Subcontractor/General Contractor Markup			30%	1,075,333	1,029,352
Subtotal Cost:				4,659,776	4,460,525
Contingency:			25%	1,164,944	1,115,131
Total Cost:				5,824,720	5,575,666
Total Cost per Cubic Yard:				$40.07	$38.36

SIDECAST DREDGE Quantity: 276,777 cubic yards

Item	Quantity	UOM	Unit Cost	Disposal	Transport
Offload Dredge Material in Slick Line					
Pump Equipment	1	LS	$150,000	$150,000	—
Pump Labor	3,690	HRS	130	479,700	—
Dump Fee	—	CY	16	—	—
Subtotal Cost:				629,700	—
Subcontractor/General Contractor Markup			30%	188,910	0
Subtotal:				818,610	0
Contingency			25%	204,653	0
Total Cost:				1,023,263	0
Total Cost per Cubic Yard:				$3.70	—

San Francisco-Oakland Bay Bridge East Span Seismic Safety Project

Air Quality Analysis For Dredging-Related Activities

This memorandum summarizes the methods and results of an air quality emissions analysis comparing representative dredged material reuse/disposal options for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. Dredged material will be generated as a result of construction of a new East Span and dismantling of the existing East Span. Dredged quantities for the bridge replacement alternatives (N-2, N-6, and S-4) are similar. Volumes for N-6 have been used in this analysis as a representative scenario.

Due to the nature of the dredging-related activities, the primary sources of air pollutant emissions would be from the exhaust of diesel-powered dredging and support equipment, marine vessels and on-road vehicles used for transport, and equipment used during unloading/loading of material. It is assumed that there would be no fugitive dust emissions as the dredged material would always be relatively moist. The emission inventory for these sources consists of emissions of total organic gases (TOG), reactive organic gases (ROG), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), and particulate matter (both total PM and PM_{10}).

Methodology

Construction activities have been divided into three general categories for evaluation and discussion: dredging, transport, and unloading/loading. Tables 1-8 summarize the types of equipment to be used and their level of usage for each of the activity categories. These tables are presented by reuse/disposal option (see the transport discussion below for option details).

Dredging

Dredging would occur over a 62-month period and would occur in four phases: construction access to construct the new bridge, construction of new piers and footings, construction access to dismantle the existing bridge, and removal of the existing bridge to the mudline (see Section 3 of the Dredged Material Management Plan). Estimated dredge quantities by construction phase are presented in Table 9 for an upper limit (construction without use of trestles and falsework) and a lower limit (construction with the use of trestles and falsework). The highest volume of dredging would occur during construction of the access channel for the new bridge, near the beginning of the project (months 4-6). The second highest volume of dredging would occur during construction of the existing bridge dismantling access channel, towards the end of the project (months 46-48). Dredging from the other two construction phases would be significantly lower.

Dredging would occur by mechanical means (e.g., by a clamshell dredge). Support equipment that would also be utilized during dredging include tug, support, and survey boats and equipment on the deck of the barges.

Transport

While a wide range of reuse/disposal sites have been considered during the preparation of the Dredged Material Management Plan, the sites that were assessed in to this air quality analysis are:

- In-Bay Disposal (Alcatraz [SF-11]), approximately 8 kilometers (5 miles) from the SFOBB site.
- Ocean Disposal (San Francisco Deep Ocean Disposal Site [SF-DODS]), approximately 102 kilometers (55 nautical miles) from the SFOBB site.
- Wetlands Reuse (Hamilton Wetlands Restoration), approximately 29 kilometers (18 miles) from the SFOBB site.
- Landfill Disposal (Altamont Landfill), approximately 70 kilometers (45 miles) from the SFOBB site.

A variety of disposal combinations, using the various disposal locations, have been developed. These options and their distribution of dredged material quantities by disposal location are presented in Tables 10 and 11 for the upper and lower dredging limits, respectively.

Emissions in this category include emissions generated by marine vessels and on-road trucks traveling to the disposal sites and while idling during unloading of the dredged material.

Unloading/Loading

For the unloading of materials at in-Bay and ocean disposal sites, the only source of air pollutant emissions would be the idling of the tugboats as the material is released into the water. Since idling is the only source of unloading emissions for these disposal options, the emissions have been included in the transport category. With the upland wetlands reuse option, sediments would be pumped as a slurry (sediment/water mix) through a eight kilometer (five mile) pipeline to the site from barges docked offshore in San Pablo Bay. Emissions would be generated by support equipment used to operate and oversee the pumping facilities. With upland disposal, dredged material would be handled twice. It would first be loaded onto a barge then off-loaded to a receiving area where it must be "worked" with heavy equipment in order to obtain a moisture content of less than 50 percent for transport and disposal. After being dried, the material would be loaded onto trucks and transported to the landfill site.

Emission Factors

Emission factors used in the analysis include those from the U.S. Environmental Protection Agency's AP-42 Compilation of Air Pollutant Emission Factors (for most equipment), the California Air Resources Board's Report to the California Legislature on Air Pollutant Emissions from Marine Vessels (for the tug boats), and the California Air Resources Board's mobile source emissions factor model (EMFAC7G) (for on-road vehicles). Emission factors are presented in Table 12.

The emissions factors are applied to usage units such as fuel usage, hours of operation, and vehicle miles traveled (which are presented in Tables 1-8) in order to calculate emissions. Emission factors for all equipment and marine vessels are presented in pounds per 1,000 gallons of fuel used. The emission factors for trucks are in grams per mile and grams per hour, depending on if the truck is moving or at idle.

Results

Daily Emissions

Construction activities and related emissions typically vary day by day depending on the level of activity. This is especially true in the case of dredging-related activities for the East Span Project, for which activities would be conducted over a 62-month period and in various phases.

Since the volume of dredging would vary greatly over the total construction period, emissions on a daily basis were not calculated for an average construction day. Instead, emissions were calculated for a maximum daily scenario. First, it was determined, based on dredge quantities, that a maximum day would occur during the preparation of an access channel for construction of the new bridge. During this phase of construction, depending on which combined reuse/disposal option is chosen, dredged material may be taken to the Hamilton Wetlands Restoration site and the Altamont Landfill (Options A, D, and E), to the ocean disposal site and the Altamont Landfill (Options B, C, F, and G), or just to the Altamont Landfill (Option H). Based on the level of activity required for each of these options, it was determined that a maximum daily scenario would likely occur during a situation where dredged material would be taken to both the ocean disposal site and the Altamont Landfill on particular day.

Table 13 includes the emissions that would be generated during the maximum daily scenario. It should be noted that the maximum daily scenario would likely only occur during construction months 4-6 and only with Options B, C, F, and G. Emissions during other phases of construction would be lower, especially during new pier construction and dismantling of existing piers.

The pollutants emitted in the largest amount would be primarily NO_x and secondarily CO. The emissions source generating the most air pollutants would be the tug boats used to transport the dredged material to the ocean disposal site. These tug boats have large engines and require more fuel than the tug boats used for the other disposal options. The dump trucks that would be used to transport the dredged material to Altamont Landfill would produce less emissions than the other means of transport used during the project (the single and double screw tug boats).

Total Emissions

The amount of emissions would vary depending upon the reuse/disposal options chosen. These variations would occur despite the fact that the same amount of material would be dredged because different equipment would be used for transport and unloading/loading

depending on where the material would be going and the distances to these disposal sites would be different.

Tables 14-21 summarize the emissions for both the upper and lower dredging limits. Construction with the lower dredging limit would result in approximately 30 to 38 percent lower emissions than construction with the upper dredging limit, depending upon the reuse/disposal option (Options A-G). The lower dredging limit would result in almost 42 percent lower emissions for Option H compared to the upper dredging limit.

The option that would generate the greatest amount of emissions would be Option C because under this scenario all dredged material suitable for unconfined aquatic disposal would be transported to the ocean disposal site. As discussed under the daily emissions discussion, the tug boats used to take dredged material to the ocean disposal site would generate the greatest amount of emissions of any of the equipment potentially used during transport of material. As a result, options with fewer or no ocean disposal trips would have lower emissions.

Options A, E, and H generate the lowest levels of emissions among the eight scenarios evaluated. The option generating the least emissions overall would be Option H (all material transported to the Altamont Landfill). Options A and E would generate lower emissions of certain pollutants (CO, organics, and PM_{10}) compared to Option H. Option H, which would require double-handling of material and trucking to a landfill, would generate the least amounts of NO_x and $S0_2$ and would have levels of organics and particulates similar to the other options. The lower levels of emissions generated by Option H occur because the trucks and material handling equipment used with this option generate lower levels of pollutants than the tug boats used with the other options. However, motor vehicles, including heavy-duty diesel trucks, generate more CO as a result of incomplete fuel combustion. CO emissions generated with Option H would be on average 25 percent higher than the other disposal options, assuming an upper dredging limit, and 20 percent higher for the lower dredging limit. Organics emissions would be similar the other options.

References

California Air Resources Board 1984, *Report to the California Legislature on Air Pollutant Emissions from Marine Vessels, Volume I.*

California Air Resources Board 1996, *Methodology for Estimating Emissions from On-road Motor Vehicles, Volume II: EMFAC7G.*

San Joaquin Valley Unified Air Pollution Control District 1998, *URBEMIS7G Computer Program User's Guide, Emissions Estimation for Land Use Development Projects.*

United States Environmental Protection Agency 1993, *AP-42 Compilation of Air Pollutant Emission Factors: Volume II: Mobile Sources.*

United States Environmental Protection Agency 1996, *AP-42 Compilation of Air Pollutant Emission Factors: Volume I: Stationary, Point and Area Sources, Supplement B.*

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 1 - Emission Source Information for Option A

Prepared By: P. McNamee
Date Prepared: 4/14/99
Checked By: I. Edmonds-Hess

Table 1
Emission Source Information for Option A

Activity / Equipment Type / Disposal Alternative	Pieces of Equipment	Horse Power (Hp)	Load Factor	Hp-Hours	Fuel Use (Gal/Hr.)	Hours Per Max. Day	Hours Per Ave. Day	Number of Work Days	Daily Maximum Fuel Usage (gals)	Total Project Fuel Usage (Upper Limit) (gals)	Total Project Fuel Usage (Lower Limit) (gals)	
Dredging												
Clamshell Dredge	2	1,800	0.80	2,880	190.2	20	10	294.0	3,804	559,188	327,125	
Anchor Tug	2	400	0.80	640	22.4	20	10	294.0	448	65,856	38,526	
Barge Equipment	3	100	0.80	240	15.9	20	10	294.0	318	46,746	27,346	
Support Boat	1	250	0.80	200	8.5	20	10	294.0	170	24,990	14,619	
Survey Boat	1	250	0.80	200	8.5	10	10	294.0	85	24,990	14,619	
Alcatraz Disposal Site												
Transport & Unloading												
Tug Boat (Single Screw)	2	1,800	0.80	2,880	210.0	8	8	20.4	1,680	34,188	26,393	
Barge Equipment	2	100	0.50	100	10.6	4	4	20.4	42	863	666	
Ocean Disposal Site												
Transport & Unloading												
Tug Boat (Double Screw)					0.0							
Barge Equipment												
Hamilton Wetland Restoration Site												
Transport												
Tug Boat (Double Screw)	1	3,000	0.80	2,400	200.0	20	10	143.0	4,000	286,000	217,360	
Barge Equipment	2	250	0.50	250	10.6	4	4	143.0	42	6,063	4,608	
Unloading												
Hydraulic Unloader	1	1,500	0.80	1,200	63.0	8	4	143.0	504	36,036	27,387	
Booster Pump	1	1,500	0.80	1,200	126.0	8	4	143.0	1,008	72,072	54,775	
Work Tug	1	400	0.50	200	11.2	8	4	143.0	90	6,406	4,869	
Generator	1	75	0.50	38	1.9	8	4	143.0	15	1,087	826	
Support Boat	1	250	0.50	125	8.5	4	2	143.0	34	2,431	1,848	
Altamont Landfill												
Transport												
Tug Boat (Single Screw)	1	1,800	0.80	1,440	105.0	8	6	25.0	840	15,750	7,922	
Barge Equipment	2	250	0.50	250	10.6	8	6	25.0	85	1,590	800	
Dump Trucks Traveling to Drying Area[1]	84	0.25						145.0	21	3,045	1,532	<- VMT
Dump Trucks Idling at Drying Area[2]	84					0.17	0.17	145.0	14	2,030	1,021	
Dump Trucks Traveling to Landfill[1]	242	90						50.0	21,780	1,089,000	547,767	<- VMT
Dump Trucks Idling at Landfill[2]	242					0.17	0.17	50.0	40	2,017	1,014	
Unloading/Loading												
Clamshell Dredge	1	1,800	0.80	1,440	95.1	10	8	36.3	951	27,617	13,891	
Barge Equipment	3	100	0.80	240	15.9	10	8	36.3	159	4,617	2,323	
D-6 Dozer	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269	
Loader	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269	
Support Boat	1	250	0.80	200	8.5	10	8	36.3	85	2,468	1,242	

Notes:

[1] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the horsepower column is the round trip travel distance, and the values in the fuel usage columns are vehicle miles traveled.

[2] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the hours per day column is the amount of idling per trip, and the values in the fuel usage columns are total amount of idling hours.

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 2 - Emission Source Information for Option B

Prepared By: P. McNamee
Date Prepared: 4/14/99
Checked By: I. Edmonds-Hess

Table 2
Emission Source Information for Option B

Activity / Equipment Type / Disposal Alternative	Pieces of Equipment	Horse Power (Hp)	Load Factor	Hp-Hours	Fuel Use (Gal/Hr.)	Hours Per Max. Day	Hours Per Ave. Day	Number of Work Days	Daily Maximum Fuel Usage (gals)	Total Project Fuel Usage (Upper Limit) (gals)	Total Project Fuel Usage (Lower Limit) (gals)
Dredging											
Clamshell Dredge	2	1,800	0.80	2,880	190.2	20	10	294.0	3,804	559,188	327,125
Anchor Tug	2	400	0.80	640	22.4	20	10	294.0	448	65,856	38,526
Barge Equipment	3	100	0.80	240	15.9	20	10	294.0	318	46,746	27,346
Support Boat	1	250	0.80	200	8.5	20	10	294.0	170	24,990	14,619
Survey Boat	1	250	0.80	200	8.5	10	10	294.0	85	24,990	14,619
Alcatraz Disposal Site											
Transport & Unloading											
Tug Boat (Single Screw)	2	1,800	0.80	2,880	210.0	8	8	20.4	1,680	34,188	26,393
Barge Equipment	2	100	0.50	100	10.6	4	4	20.4	42	863	666
Ocean Disposal Site											
Transport & Unloading											
Tug Boat (Double Screw)	2	3,000	0.80	4,800	400.0	24	24	52.0	9,600	499,200	379,392
Barge Equipment	2	250	0.50	250	10.6	4	4	52.0	42	2,205	1,676
Hamilton Wetland Restoration Site											
Transport											
Tug Boat (Double Screw)											
Barge Equipment											
Unloading											
Hydraulic Unloader											
Booster Pump											
Work Tug											
Generator											
Support Boat											
Altamont Landfill											
Transport											
Tug Boat (Single Screw)	1	1,800	0.80	1,440	105.0	8	6	25.0	840	15,750	7,922
Barge Equipment	2	250	0.50	250	10.6	8	6	25.0	85	1,590	800
Dump Trucks Traveling to Drying Area[1]	84	0.25						145.0	21	3,045	1,532
Dump Trucks Idling at Drying Area[2]	84					0.17	0.17	145.0	14	2,030	1,021
Dump Trucks Traveling to Landfill[1]	242	90						50.0	21,780	1,089,000	547,767
Dump Trucks Idling at Landfill[2]	242					0.17	0.17	50.0	40	2,017	1,014
Unloading/Loading											
Clamshell Dredge	1	1,800	0.80	1,440	95.1	10	8	36.3	951	27,617	13,891
Barge Equipment	3	100	0.80	240	15.9	10	8	36.3	159	4,617	2,323
D-6 Dozer	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Loader	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Support Boat	1	250	0.80	200	8.5	10	8	36.3	85	2,468	1,242

Notes:

[1] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the horsepower column is the round trip travel distance, and the values in the fuel usage columns are vehicle miles traveled.

[2] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the hours per day column is the amount of idling per trip, and the values in the fuel usage columns are total amount of idling hours.

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 3 - Emission Source Information for Option C

Prepared By: P. McNamee
Date Prepared: 4/14/99
Checked By: I. Edmonds-Hess

Table 3
Emission Source Information for Option C

Activity / Equipment Type / Disposal Alternative	Pieces of Equipment	Horse Power (Hp)	Load Factor	Hp-Hours	Fuel Use (Gal/Hr.)	Hours Per Max. Day	Hours Per Ave. Day	Number of Work Days	Daily Maximum Fuel Usage (gals)	Total Project Fuel Usage (Upper Limit) (gals)	Total Project Fuel Usage (Lower Limit) (gals)
Dredging											
Clamshell Dredge	2	1,800	0.80	2,880	190.2	20	10	294.0	3,804	559,188	327,125
Anchor Tug	2	400	0.80	640	22.4	20	10	294.0	448	65,856	38,526
Barge Equipment	3	100	0.80	240	15.9	20	10	294.0	318	46,746	27,346
Support Boat	1	250	0.80	200	8.5	20	10	294.0	170	24,990	14,619
Survey Boat	1	250	0.80	200	8.5	10	10	294.0	85	24,990	14,619
Alcatraz Disposal Site											
Transport & Unloading											
Tug Boat (Single Screw)					0.0						
Barge Equipment											
Ocean Disposal Site											
Transport & Unloading											
Tug Boat (Double Screw)	2	3,000	0.80	4,800	400.0	24	24	60.0	9,600	576,000	438,912
Barge Equipment	2	250	0.50	250	10.6	4	4	60.0	42	2,544	1,939
Hamilton Wetland Restoration Site											
Transport											
Tug Boat (Double Screw)					0.0						
Barge Equipment											
Unloading											
Hydraulic Unloader											
Booster Pump											
Work Tug											
Generator											
Support Boat											
Altamont Landfill											
Transport											
Tug Boat (Single Screw)	1	1,800	0.80	1,440	105.0	8	6	25.0	840	15,750	7,922
Barge Equipment	2	250	0.50	250	10.6	8	6	25.0	85	1,590	800
Dump Trucks Traveling to Drying Area[1]	84	0.25						145.0	21	3,045	1,532
Dump Trucks Idling at Drying Area[2]	84					0.17	0.17	145.0	14	2,030	1,021
Dump Trucks Traveling to Landfill[1]	242	90						50.0	21,780	1,089,000	547,767
Dump Trucks Idling at Landfill[2]	242					0.17	0.17	50.0	40	2,017	1,014
Unloading/Loading											
Clamshell Dredge	1	1,800	0.80	1,440	95.1	10	8	36.3	951	27,617	13,891
Barge Equipment	3	100	0.80	240	15.9	10	8	36.3	159	4,617	2,323
D-6 Dozer	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Loader	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Support Boat	1	250	0.80	200	8.5	10	8	36.3	85	2,468	1,242

Notes:

[1] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the horsepower column is the round trip travel distance, and the values in the fuel usage columns are vehicle miles traveled.

[2] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the hours per day column is the amount of idling per trip, and the values in the fuel usage columns are total amount of idling hours.

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 4 - Emission Source Information for Option D

Prepared By: P. McNamee
Date Prepared: 4/14/99
Checked By: I. Edmonds-Hess

Table 4
Emission Source Information for Option D

Activity / Equipment Type / Disposal Alternative	Pieces of Equipment	Horse Power (Hp)	Load Factor	Hp-Hours	Fuel Use (Gal/Hr.)	Hours Per Max. Day	Hours Per Ave. Day	Number of Work Days	Daily Maximum Fuel Usage (gals)	Total Project Fuel Usage (Upper Limit) (gals)	Total Project Fuel Usage (Lower Limit) (gals)
Dredging											
Clamshell Dredge	2	1,800	0.80	2,880	190.2	20	10	294.0	3,804	559,188	327,125
Anchor Tug	2	400	0.80	640	22.4	20	10	294.0	448	65,856	38,526
Barge Equipment	3	100	0.80	240	15.9	20	10	294.0	318	46,746	27,346
Support Boat	1	250	0.80	200	8.5	20	10	294.0	170	24,990	14,619
Survey Boat	1	250	0.80	200	8.5	10	10	294.0	85	24,990	14,619
Alcatraz Disposal Site											
Transport & Unloading											
Tug Boat (Single Screw)					0.0						
Barge Equipment											
Ocean Disposal Site											
Transport & Unloading											
Tug Boat (Double Screw)	2	3,000	0.80	4,800	400.0	24	24	8.8	9,600	84,480	65,219
Barge Equipment	2	250	0.50	250	10.6	4	4	8.8	42	373	288
Hamilton Wetland Restoration Site											
Transport											
Tug Boat (Double Screw)	1	3,000	0.80	2,400	200.0	20	10	143.0	4,000	286,000	217,360
Barge Equipment	2	250	0.50	250	10.6	4	4	143.0	42	6,063	4,608
Unloading											
Hydraulic Unloader	1	1,500	0.80	1,200	63.0	8	4	143.0	504	36,036	27,387
Booster Pump	1	1,500	0.80	1,200	126.0	8	4	143.0	1,008	72,072	54,775
Work Tug	1	400	0.50	200	11.2	8	4	143.0	90	6,406	4,869
Generator	1	75	0.50	38	1.9	8	4	143.0	15	1,087	826
Support Boat	1	250	0.50	125	8.5	4	2	143.0	34	2,431	1,848
Altamont Landfill											
Transport											
Tug Boat (Single Screw)	1	1,800	0.80	1,440	105.0	8	6	25.0	840	15,750	7,922
Barge Equipment	2	250	0.50	250	10.6	8	6	25.0	85	1,590	800
Dump Trucks Traveling to Drying Area[1]	84	0.25						145.0	21	3,045	1,532
Dump Trucks Idling at Drying Area[2]	84					0.17	0.17	145.0	14	2,030	1,021
Dump Trucks Traveling to Landfill[1]	242	90						50.0	21,780	1,089,000	547,767
Dump Trucks Idling at Landfill[2]	242					0.17	0.17	50.0	40	2,017	1,014
Unloading/Loading											
Clamshell Dredge	1	1,800	0.80	1,440	95.1	10	8	36.3	951	27,617	13,891
Barge Equipment	3	100	0.80	240	15.9	10	8	36.3	159	4,617	2,323
D-6 Dozer	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Loader	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Support Boat	1	250	0.80	200	8.5	10	8	36.3	85	2,468	1,242

Notes:

[1] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the horsepower column is the round trip travel distance, and the values in the fuel usage columns are vehicle miles traveled.

[2] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the hours per day column is the amount of idling per trip, and the values in the fuel usage columns are total amount of idling hours.

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 5 - Emission Source Information for Option B

Prepared By: P. McNamee
Date Prepared: 4/14/99
Checked By: I. Edmonds-Hess

Table 5
Emission Source Information for Option E

Activity / Equipment Type / Disposal Alternative	Pieces of Equipment	Horse Power (Hp)	Load Factor	Hp-Hours	Fuel Use (Gal/Hr.)	Hours Per Max. Day	Hours Per Ave. Day	Number of Work Days	Daily Maximum Fuel Usage (gals)	Total Project Fuel Usage (Upper Limit) (gals)	Total Project Fuel Usage (Lower Limit) (gals)
Dredging											
Clamshell Dredge	2	1,800	0.80	2,880	190.2	20	10	294.0	3,804	559,188	327,125
Anchor Tug	2	400	0.80	640	22.4	20	10	294.0	448	65,856	38,526
Barge Equipment	3	100	0.80	240	15.9	20	10	294.0	318	46,746	27,346
Support Boat	1	250	0.80	200	8.5	20	10	294.0	170	24,990	14,619
Survey Boat	1	250	0.80	200	8.5	10	10	294.0	85	24,990	14,619
Alcatraz Disposal Site											
Transport & Unloading											
Tug Boat (Single Screw)					0.0						
Barge Equipment											
Ocean Disposal Site											
Transport & Unloading											
Tug Boat (Double Screw)					0.0						
Barge Equipment											
Hamilton Wetland Restoration Site											
Transport											
Tug Boat (Double Screw)	1	3,000	0.80	2,400	200.0	20	10	165.0	4,000	330,000	251,460
Barge Equipment	2	250	0.50	250	10.6	4	4	165.0	42	6,996	5,331
Unloading											
Hydraulic Unloader	1	1,500	0.80	1,200	63.0	8	4	165.0	504	41,580	31,684
Booster Pump	1	1,500	0.80	1,200	126.0	8	4	165.0	1,008	83,160	63,368
Work Tug	1	400	0.50	200	11.2	8	4	165.0	90	7,392	5,633
Generator	1	75	0.50	38	1.9	8	4	165.0	15	1,254	956
Support Boat	1	250	0.50	125	8.5	4	2	165.0	34	2,805	2,137
Altamont Landfill											
Transport											
Tug Boat (Single Screw)	1	1,800	0.80	1,440	105.0	8	6	25.0	840	15,750	7,922
Barge Equipment	2	250	0.50	250	10.6	8	6	25.0	85	1,590	800
Dump Trucks Traveling to Drying Area[1]	84	0.25						145.0	21	3,045	1,532
Dump Trucks Idling at Drying Area[2]	84					0.17	0.17	145.0	14	2,030	1,021
Dump Trucks Traveling to Landfill[1]	242	90						50.0	21,780	1,089,000	547,767
Dump Trucks Idling at Landfill[2]	242					0.17	0.17	50.0	40	2,017	1,014
Unloading/Loading											
Clamshell Dredge	1	1,800	0.80	1,440	95.1	10	8	36.3	951	27,617	13,891
Barge Equipment	3	100	0.80	240	15.9	10	8	36.3	159	4,617	2,323
D-6 Dozer	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Loader	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Support Boat	1	250	0.80	200	8.5	10	8	36.3	85	2,468	1,242

Notes:

[1] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the horsepower column is the round trip travel distance, and the values in the fuel usage columns are vehicle miles traveled.

[2] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the hours per day column is the amount of idling per trip, and the values in the fuel usage columns are total amount of idling hours.

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 6 - Emission Source Information for Option P

Prepared By: P. McNamee
Date Prepared: 4/14/99
Checked By: I. Edmonds-Hess

Table 6
Emission Source Information for Option F

Activity / Equipment Type / Disposal Alternative	Pieces of Equipment	Horse Power (Hp)	Load Factor	Hp-Hours	Fuel Use (Gal/Hr.)	Hours Per Max. Day	Hours Per Ave. Day	Number of Work Days	Daily Maximum Fuel Usage (gals)	Total Project Fuel Usage (Upper Limit) (gals)	Total Project Fuel Usage (Lower Limit) (gals)
Dredging											
Clamshell Dredge	2	1,800	0.80	2,880	190.2	20	10	294.0	3,804	559,188	327,125
Anchor Tug	2	400	0.80	640	22.4	20	10	294.0	448	65,856	38,526
Barge Equipment	3	100	0.80	240	15.9	20	10	294.0	318	46,746	27,346
Support Boat	1	250	0.80	200	8.5	20	10	294.0	170	24,990	14,619
Survey Boat	1	250	0.80	200	8.5	10	10	294.0	85	24,990	14,619
Alcatraz Disposal Site											
Transport & Unloading											
Tug Boat (Single Screw)	2	1,800	0.80	2,880	210.0	8	8	20.4	1,680	34,188	26,393
Barge Equipment	2	100	0.50	100	10.6	4	4	20.4	42	863	666
Ocean Disposal Site											
Transport & Unloading											
Tug Boat (Double Screw)	2	3,000	0.80	4,800	400.0	24	24	31.2	9,600	299,520	179,412
Barge Equipment	2	250	0.50	250	10.6	4	4	31.2	42	1,323	739
Hamilton Wetland Restoration Site											
Transport											
Tug Boat (Double Screw)	1	3,000	0.80	2,400	200.0	20	10	57.2	4,000	114,400	114,400
Barge Equipment	2	250	0.50	250	10.6	4	4	57.2	42	2,425	2,425
Unloading											
Hydraulic Unloader	1	1,500	0.80	1,200	63.0	8	4	57.2	504	14,414	14,414
Booster Pump	1	1,500	0.80	1,200	126.0	8	4	57.2	1,008	28,829	28,829
Work Tug	1	400	0.50	200	11.2	8	4	57.2	90	2,563	2,563
Generator	1	75	0.50	38	1.9	8	4	57.2	15	435	435
Support Boat	1	250	0.50	125	8.5	4	2	57.2	34	972	972
Altamont Landfill											
Transport											
Tug Boat (Single Screw)	1	1,800	0.80	1,440	105.0	8	6	25.0	840	15,750	7,922
Barge Equipment	2	250	0.50	250	10.6	8	6	25.0	85	1,590	800
Dump Trucks Traveling to Drying Area[1]	84	0.25						145.0	21	3,045	1,532
Dump Trucks Idling at Drying Area[2]	84					0.17	0.17	145.0	14	2,030	1,021
Dump Trucks Traveling to Landfill[1]	242	90						50.0	21,780	1,089,000	547,767
Dump Trucks Idling at Landfill[2]	242					0.17	0.17	50.0	40	2,017	1,014
Unloading/Loading											
Clamshell Dredge	1	1,800	0.80	1,440	95.1	10	8	36.3	951	27,617	13,891
Barge Equipment	3	100	0.80	240	15.9	10	8	36.3	159	4,617	2,323
D-6 Dozer	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Loader	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Support Boat	1	250	0.80	200	8.5	10	8	36.3	85	2,468	1,242

Notes:

[1] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the horsepower column is the round trip travel distance, and the values in the fuel usage columns are vehicle miles traveled.

[2] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the hours per day column is the amount of idling per trip, and the values in the fuel usage columns are total amount of idling hours.

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 7 - Emission Source Information for Option G

Prepared By: P. McNamee
Date Prepared: 4/14/99
Checked By: I. Edmonds-Hess

Table 7
Emission Source Information for Option G

Activity / Equipment Type / Disposal Alternative	Pieces of Equipment	Horse Power (Hp)	Load Factor	Hp-Hours	Fuel Use (Gal/Hr.)	Hours Per Max. Day	Hours Per Ave. Day	Number of Work Days	Daily Maximum Fuel Usage (gals)	Total Project Fuel Usage (Upper Limit) (gals)	Total Project Fuel Usage (Lower Limit) (gals)
Dredging											
Clamshell Dredge	2	1,800	0.80	2,880	190.2	20	10	294.0	3,804	559,188	327,125
Anchor Tug	2	400	0.80	640	22.4	20	10	294.0	448	65,856	38,526
Barge Equipment	3	100	0.80	240	15.9	20	10	294.0	318	46,746	27,346
Support Boat	1	250	0.80	200	8.5	20	10	294.0	170	24,990	14,619
Survey Boat	1	250	0.80	200	8.5	10	10	294.0	85	24,990	14,619
Alcatraz Disposal Site											
Transport & Unloading											
Tug Boat (Single Screw)	2	1,800	0.80	2,880	210.0	8	8	13.0	1,680	21,840	22,080
Barge Equipment	2	100	0.50	100	10.6	4	4	13.0	42	551	557
Ocean Disposal Site											
Transport & Unloading											
Tug Boat (Double Screw)	2	3,000	0.80	4,800	400.0	24	24	31.2	9,600	299,520	179,412
Barge Equipment	2	250	0.50	250	10.6	4	4	31.2	42	1,323	739
Hamilton Wetland Restoration Site											
Transport											
Tug Boat (Double Screw)	1	3,000	0.80	2,400	200.0	20	10	63.8	4,000	127,600	116,754
Barge Equipment	2	250	0.50	250	10.6	4	4	63.8	42	2,705	2,475
Unloading											
Hydraulic Unloader	1	1,500	0.80	1,200	63.0	8	4	63.8	504	16,078	14,711
Booster Pump	1	1,500	0.80	1,200	126.0	8	4	63.8	1,008	32,155	29,422
Work Tug	1	400	0.50	200	11.2	8	4	63.8	90	2,858	2,615
Generator	1	75	0.50	38	1.9	8	4	63.8	15	485	444
Support Boat	1	250	0.50	125	8.5	4	2	63.8	34	1,085	992
Altamont Landfill											
Transport											
Tug Boat (Single Screw)	1	1,800	0.80	1,440	105.0	8	6	25.0	840	15,750	7,922
Barge Equipment	2	250	0.50	250	10.6	8	6	25.0	85	1,590	800
Dump Trucks Traveling to Drying Area[1]	84	0.25						145.0	21	3,045	1,532
Dump Trucks Idling at Drying Area[2]	84					0.17	0.17	145.0	14	2,030	1,021
Dump Trucks Traveling to Landfill[1]	242	90						50.0	21,780	1,089,000	547,767
Dump Trucks Idling at Landfill[2]	242					0.17	0.17	50.0	40	2,017	1,014
Unloading/Loading											
Clamshell Dredge	1	1,800	0.80	1,440	95.1	10	8	36.3	951	27,617	13,891
Barge Equipment	3	100	0.80	240	15.9	10	8	36.3	159	4,617	2,323
D-6 Dozer	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Loader	1	300	0.50	150	16.0	10	8	66.3	160	8,486	4,269
Support Boat	1	250	0.80	200	8.5	10	8	36.3	85	2,468	1,242

Notes:

[1] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the horsepower column is the round trip travel distance, and the values in the fuel usage columns are vehicle miles traveled.

[2] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the hours per day column is the amount of idling per trip, and the values in the fuel usage columns are total amount of idling hours.

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 8 - Emission Source Information for Option H

Prepared By: P. McNamee
Date Prepared: 4/14/99
Checked By: I. Edmonds-Hess

Table 8
Emission Source Information for Option H

Activity / Equipment Type / Disposal Alternative	Pieces of Equipment	Horse Power (Hp)	Load Factor	Hp-Hours	Fuel Use (Gal/Hr.)	Hours Per Max. Day	Hours Per Ave. Day	Number of Work Days	Daily Maximum Fuel Usage (gals)	Total Project Fuel Usage (Upper Limit) (gals)	Total Project Fuel Usage (Lower Limit) (gals)
Dredging											
Clamshell Dredge	2	1,800	0.80	2,880	190.2	20	10	294.0	3,804	559,188	327,125
Anchor Tug	2	400	0.80	640	22.4	20	10	294.0	448	65,856	38,526
Barge Equipment	3	100	0.80	240	15.9	20	10	294.0	318	46,746	27,346
Support Boat	1	250	0.80	200	8.5	20	10	294.0	170	24,990	14,619
Survey Boat	1	250	0.80	200	8.5	10	10	294.0	85	24,990	14,619
Alcatraz Disposal Site											
Transport & Unloading											
Tug Boat (Single Screw)					0.0						
Barge Equipment											
Ocean Disposal Site											
Transport & Unloading											
Tug Boat (Double Screw)					0.0						
Barge Equipment											
Hamilton Wetland Restoration Site											
Transport											
Tug Boat (Double Screw)					0.0						
Barge Equipment											
Unloading											
Hydraulic Unloader											
Booster Pump											
Work Tug											
Generator											
Support Boat											
Altamont Landfill											
Transport											
Tug Boat (Single Screw)	1	1,800	0.80	1,440	105.0	8	6	100.0	840	63,000	36,855
Barge Equipment	2	250	0.50	250	10.6	8	6	100.0	85	6,360	3,721
Dump Trucks Traveling to Drying Area[1]	336	0.25						145.0	84	12,180	7,125
Dump Trucks Idling at Drying Area[2]	336					0.17	0.17	145.0	56	8,120	4,750
Dump Trucks Traveling to Landfill[1]	340	90						144.0	30,600	4,406,400	2,577,744
Dump Trucks Idling at Landfill[2]	340					0.17	0.17	144.0	57	8,160	4,774
Unloading/Loading											
Clamshell Dredge	1	1,800	0.80	1,440	95.1	10	8	145.0	951	110,316	64,535
Barge Equipment	3	100	0.80	240	15.9	10	8	145.0	159	18,444	10,790
D-6 Dozer	1	300	0.50	150	16.0	10	8	265.0	160	33,920	19,843
Loader	1	300	0.50	150	16.0	10	8	265.0	160	33,920	19,843
Support Boat	1	250	0.80	200	8.5	10	8	145.0	85	9,860	5,768

Notes:

[1] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the horsepower column is the round trip travel distance, and the values in the fuel usage columns are vehicle miles traveled.

[2] In this case, the value in the pieces of equipment column is actually the number of truck trips, the value in the hours per day column is the amount of idling per trip, and the values in the fuel usage columns are total amount of idling hours.

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 9 - Estimated Dredge Quantities By Construction Phase

Prepared By: I. Edmonds-Hess
Date Prepared: 4/13/99
Checked By: L. Spurgeon

Table 9
Estimated Dredge Quantities

	Dredged Material to Construct New Bridge Access		Dredged Material to Construct New Piers and Footings		Dredged Material to Construct Dismantling Access		Dredged Material to Remove Existing Piers		Total	
	(m^3)	(yds^3)	(m^3)	(yds^3)	(m^3)	(yds^3)	(m^3)	(yds^3)	(m^3)	(yds^3)
Without Trestle/Falsework (Upper Limit)	282,000	368,000	35,000	45,000	116,000	152,000	16,000	21,000	448,000	585,000
With Trestle/Falsework (Lower Limit)	104,000	135,000	38,000	49,000	116,000	152,000	5,000	6,000	262,000	343,000

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 10 - Distribution of Dredged Material - Upper Limit

Prepared By: I. Edmonds-Hess
Date Prepared: 4/13/99
Checked By: L. Spurgeon

Table 10
Distribution of Dredged Material Among Reuse/Disposal Options
For Upper Limit Dredging

	Alcatraz (SF-11)		San Francisco Deep Ocean Disposal Site (SF-DODS)		Hamilton Wetlands Restoration		Altamont Landfill	
Option	Dredged Material Quantity (m^3)	Dredged Material Quantity (yds^3)	Dredged Material Quantity (m^3)	Dredged Material Quantity (yds^3)	Dredged Material Quantity (m^3)	Dredged Material Quantity (yds^3)	Dredged Material Quantity (m^3)	Dredged Material Quantity (yds^3)
A	47,711	62,401	0	0	288,737	377,631	111,120	145,332
B	47,711	62,401	288,737	377,631	0	0	111,120	145,332
C	0	0	336,448	440,032	0	0	111,120	145,332
D	0	0	47,711	62,401	288,737	377,631	111,120	145,332
E	0	0	0	0	336,448	440,032	111,120	145,332
F	47,711	62,401	172,782	225,977	115,955	151,654	111,120	145,332
G	31,919	41,747	172,782	225,977	131,747	172,308	111,120	145,332
H	0	0	0	0	0	0	447,568	585,364

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 11 - Distribution of Dredged Material - Lower Limit

Prepared By: I. Edmonds-Hess
Date Prepared: 4/13/99
Checked By: L. Spurgeon

Table 11
Distribution of Dredged Material Among Reuse/Disposal Options
For Lower Limit Dredging

	Alcatraz (SF-11)		San Francisco Deep Ocean Disposal Site (SF-DODS)		Hamilton Wetlands Restoration		Altamont Landfill	
Option	Dredged Material Quantity (m^3)	Dredged Material Quantity (yds^3)	Dredged Material Quantity (m^3)	Dredged Material Quantity (yds^3)	Dredged Material Quantity (m^3)	Dredged Material Quantity (yds^3)	Dredged Material Quantity (m^3)	Dredged Material Quantity (yds^3)
A	36,849	48,198	0	0	219,475	287,045	5,588	7,308
B	36,849	48,198	219,475	287,045	0	0	5,588	7,308
C	0	0	256,324	335,243	0	0	5,588	7,308
D	0	0	36,849	48,198	219,475	287,045	5,588	7,308
E	0	0	0	0	256,324	335,243	5,588	7,308
F	36,849	48,198	103,520	135,391	115,955	151,654	5,588	7,308
G	32,257	42,192	103,520	135,391	120,547	157,660	5,588	7,308
H	0	0	0	0	0	0	261,912	342,551

Project:	San Francisco-Oakland Bay Bridge East Span Seismic Safety Project	Prepared By:	L. Spurgeon
Subject:	Table 12 - Emission Factors for Equipment Used	Date Prepared:	4/12/99
		Checked By:	I. Edmonds-Hess

Table 12
Emission Factors for Equipment Used
(in pounds pollutant per 1,000 gallons Diesel consumed)

Equipment	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	Source
Barge Equipment	58.93	56.57	130.18	604.3	39.74	42.48	40.78	c
Boat, Support	45.7	43.87	70.2	407.5	28.5	33	31.68	b
Boat, Survey	180	172.8	140	340	27	-	-	d
Boat, Tug	45.7	43.87	70.2	407.5	28.5	33	31.68	b
Dozer, D-6	33.82	32.47	78.5	284.92	31.1	25.3	24.29	e
Dredge, Clamshell	12.33	11.84	116.48	424.79	27.68	10.46	6.8	a
Generator	40.48	38.86	153.51	258.6	31.2	27.3	26.21	e
Hydraulic Unloader	12.33	11.84	110.99	424.79	27.68	10.46	6.8	a
Loader	50.33	48.32	98.66	321.23	31.2	29.3	28.13	e
Pump, Booster	12.33	11.84	116.48	424.79	27.68	10.46	6.8	a
Truck, End-dump (g/mile at 30 mph)	1.45	1.39	8.32	9.28	0.00	1.07	1.03	f
Truck, End-dump (g/hr at idle)	19.53	18.70	169.30	82.80	0.00	3.35	3.35	f

Source:

a AP-42, Table 3.4-1, Volume I Supplement B (Environmental Protection Agency 1996)

b Report on Air Pollutant Emissions from Marine Vessels (California Air Resources Board, 1984)
SO_2 and PM emission factors from Scott Environmental Technology (1981)

c AP-42, Table 3.3-1, Volume I Supplement B (Environmental Protection Agency 1996)

d AP-42, Table II-3.5, Volume II (Environmental Protection Agency 1993)

e AP-42, Table II-7.1, Volume II (Environmental Protection Agency 1993)

f EMFAC7G emission factor model for year 2000. Heavy-duty diesel truck at 30 mph and idle (5 mph)
PM emission factors include exhaust, tire and brake wear, and entrained dust (from URBEMIS7G)
SO_2 assumed to be zero.

Project:	San Francisco-Oakland Bay Bridge East Span Seismic Safety Project	Prepared By:	I. Edmonds-Hess
Subject:	Table 13 - Maximum Daily Emissions	Date Prepared:	4/14/99
	(Occurs during Dredging for Construction Access for the New Bridge)	Checked By:	L. Spurgeon

Table 13
Maximum Daily Emissions

Activity/Equipment	Maximum Daily Emissions[1] (in pounds/day)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Dredging							
Clamshell Dredge	47	45	443	1,616	105	40	26
Anchor Tug	20	20	31	183	13	15	14
Barge Equipment	19	18	41	192	13	14	13
Support Boat	8	7	12	69	5	6	5
Survey Boat[2]	15	15	12	29	2	3	3
Dredging Total	109	105	540	2,089	138	76	61
Transport							
Transport to Altamont							
Tug Boat (Single Screw)	38	37	59	342	24	28	27
Barge Equipment	5	5	11	51	3	4	3
Dump Trucks Traveling to Drying Area[3]	0	0	0	0	0	0	0
Dump Trucks Idling at Drying Area[4]	1	1	5	3	0	0	0
Dump Trucks Traveling to Landfill[3]	69	67	399	445	0	51	49
Dump Trucks Idling at Landfill[4]	2	2	15	7	0	0	0
Transport to & Unloading at Ocean Disposal Site							
Tug Boat (Double Screw)	439	421	674	3,912	274	317	304
Barge Equipment	2	2	6	26	2	2	2
Transport Total	556	534	1,169	4,786	303	402	385
Unloading							
Unloading/Loading for Altamont							
Clamshell Dredge	12	11	111	404	26	10	6
Barge Equipment	9	9	21	96	6	7	6
D-6 Dozer	5	5	13	46	5	4	4
Loader	8	8	16	51	5	5	5
Support Boat	4	4	6	35	2	3	3
Unloading Total	38	37	166	632	45	28	24
Total	704	676	1,874	7,507	485	506	471

Notes:

[1] Emissions (lbs/day) = Daily Fuel Usage (in gals)/1000 x Emission Factor (in lbs/1000 gals of fuel)

[2] Particulate matter emission factors were not available, so emission factors for support boats was used.

[3] Emissions (lbs/day) = Vehicle Miles Traveled x Emission Factor (in grams/mile) x 0.0022 lbs/gram

[4] Emissions (lbs/day) = Hours of Idling x Emission Factor (in grams/hour) x 0.0022 lbs/gram

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 14 - Total Dredging-Related Emissions for Option A

Prepared By: I. Edmonds-Hess
Date Prepared: 4/14/99
Checked By: L. Spurgeon

Table 14
Total Dredging-Related Emissions for Option A

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Dredging														
Clamshell Dredge	3.45	3.31	32.57	118.77	7.74	2.92	1.90	2.02	1.94	19.05	69.48	4.53	1.71	1.11
Anchor Tug	1.50	1.44	2.31	13.42	0.94	1.09	1.04	0.88	0.85	1.35	7.85	0.55	0.64	0.61
Barge Equipment	1.38	1.32	3.04	14.12	0.93	0.99	0.95	0.81	0.77	1.78	8.26	0.54	0.58	0.56
Support Boat	0.57	0.55	0.88	5.09	0.36	0.41	0.40	0.33	0.32	0.51	2.98	0.21	0.24	0.23
Survey Boat[2]	2.25	2.16	1.75	4.25	0.34	0.41	0.40	1.32	1.26	1.02	2.49	0.20	0.24	0.23
Alcatraz Disposal Site														
Transport & Unloading														
Tug Boat (Single Screw)	0.78	0.75	1.20	6.97	0.49	0.56	0.54	0.60	0.58	0.93	5.38	0.38	0.44	0.42
Barge Equipment	0.03	0.02	0.06	0.26	0.02	0.02	0.02	0.02	0.02	0.04	0.20	0.01	0.01	0.01
Ocean Disposal Site														
Transport & Unloading														
Tug Boat (Double Screw)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hamilton Wetland Restoration Site														
Transport														
Tug Boat (Double Screw)	6.54	6.27	10.04	58.27	4.08	4.72	4.53	4.97	4.77	7.63	44.29	3.10	3.59	3.44
Barge Equipment	0.18	0.17	0.39	1.83	0.12	0.13	0.12	0.14	0.13	0.30	1.39	0.09	0.10	0.09
Unloading														
Hydraulic Unloader	0.22	0.21	2.00	7.65	0.50	0.19	0.12	0.17	0.16	1.52	5.82	0.38	0.14	0.09
Booster Pump	0.44	0.43	4.20	15.31	1.00	0.38	0.25	0.34	0.32	3.19	11.63	0.76	0.29	0.19
Work Tug	0.15	0.14	0.22	1.31	0.09	0.11	0.10	0.11	0.11	0.17	0.99	0.07	0.08	0.08
Generator	0.02	0.02	0.08	0.14	0.02	0.01	0.01	0.02	0.02	0.06	0.11	0.01	0.01	0.01
Support Boat	0.06	0.05	0.09	0.50	0.03	0.04	0.04	0.04	0.04	0.06	0.38	0.03	0.03	0.03

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 14 - Total Dredging-Related Emissions for Option A

Prepared By: I. Edmonds-Hess
Date Prepared: 4/14/99
Checked By: L. Spurgeon

Table 14
Total Dredging-Related Emissions for Option A

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Altamont Landfill														
Transport														
Tug Boat (Single Screw)	0.36	0.35	0.55	3.21	0.22	0.26	0.25	0.18	0.17	0.28	1.61	0.11	0.13	0.13
Barge Equipment	0.05	0.04	0.10	0.48	0.03	0.03	0.03	0.02	0.02	0.05	0.24	0.02	0.02	0.02
Dump Trucks Traveling to Drying Area[3]	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00
Dump Trucks Idling at Drying Area[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Dump Trucks Traveling to Landfill[3]	1.74	1.67	9.97	11.12	0.00	1.28	1.23	0.87	0.84	5.01	5.59	0.00	0.64	0.62
Dump Trucks Idling at Landfill[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Unloading/Loading														
Clamshell Dredge	0.17	0.16	1.61	5.87	0.38	0.14	0.09	0.09	0.08	0.81	2.95	0.19	0.07	0.05
Barge Equipment	0.14	0.13	0.30	1.40	0.09	0.10	0.09	0.07	0.07	0.15	0.70	0.05	0.05	0.05
D-6 Dozer	0.14	0.14	0.33	1.21	0.13	0.11	0.10	0.07	0.07	0.17	0.61	0.07	0.05	0.05
Loader	0.21	0.21	0.42	1.36	0.13	0.12	0.12	0.11	0.10	0.21	0.69	0.07	0.06	0.06
Support Boat	0.06	0.05	0.09	0.50	0.04	0.04	0.04	0.03	0.03	0.04	0.25	0.02	0.02	0.02
Total	21	20	73	273	18	14	12	13	13	45	174	11	9	8

Notes:

[1] Emissions (tons) = Total Fuel Usage (in gals)/1000 x Emission Factor (lbs/1000 gals of fuel) x 0.0005 tons/lb

[2] Particulate matter emission factors were not available, so emission factors for support boats was used.

[3] Emissions (tons) = Vehicle Miles Traveled x Emission Factor (in grams/mile) x 0.0022 lbs/gram x 0.0005 tons/lb

[4] Emissions (tons) = Hours of Idling x Emission Factor (in grams/hour) x 0.0022 lbs/gram x 0.0005 tons/lb

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 15 - Total Dredging-Related Emissions for Option B

Prepared By: I. Edmonds-Hess
Date Prepared: 4/14/99
Checked By: L. Spurgeon

Table 15
Total Dredging-Related Emissions for Option B

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Dredging														
Clamshell Dredge	3.45	3.31	32.57	118.77	7.74	2.92	1.90	2.02	1.94	19.05	69.48	4.53	1.71	1.11
Anchor Tug	1.50	1.44	2.31	13.42	0.94	1.09	1.04	0.88	0.85	1.35	7.85	0.55	0.64	0.61
Barge Equipment	1.38	1.32	3.04	14.12	0.93	0.99	0.95	0.81	0.77	1.78	8.26	0.54	0.58	0.56
Support Boat	0.57	0.55	0.88	5.09	0.36	0.41	0.40	0.33	0.32	0.51	2.98	0.21	0.24	0.23
Survey Boat[2]	2.25	2.16	1.75	4.25	0.34	0.41	0.40	1.32	1.26	1.02	2.49	0.20	0.24	0.23
Alcatraz Disposal Site														
Transport & Unloading														
Tug Boat (Single Screw)	0.78	0.75	1.20	6.97	0.49	0.56	0.54	0.60	0.58	0.93	5.38	0.38	0.44	0.42
Barge Equipment	0.03	0.02	0.06	0.26	0.02	0.02	0.02	0.02	0.02	0.04	0.20	0.01	0.01	0.01
Ocean Disposal Site														
Transport & Unloading														
Tug Boat (Double Screw)	11.41	10.95	17.52	101.71	7.11	8.24	7.91	8.67	8.32	13.32	77.30	5.41	6.26	6.01
Barge Equipment	0.06	0.06	0.14	0.67	0.04	0.05	0.04	0.05	0.05	0.11	0.51	0.03	0.04	0.03
Hamilton Wetland Restoration Site														
Transport														
Tug Boat (Double Screw)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unloading														
Hydraulic Unloader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Booster Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Work Tug	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Support Boat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 15 - Total Dredging-Related Emissions for Option B

Prepared By: I. Edmonds-Hess
Date Prepared: 4/14/99
Checked By: L. Spurgeon

Table 15
Total Dredging-Related Emissions for Option B

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Altamont Landfill														
Transport														
Tug Boat (Single Screw)	0.36	0.35	0.55	3.21	0.22	0.26	0.25	0.18	0.17	0.28	1.61	0.11	0.13	0.13
Barge Equipment	0.05	0.04	0.10	0.48	0.03	0.03	0.03	0.02	0.02	0.05	0.24	0.02	0.02	0.02
Dump Trucks Traveling to Drying Area[3]	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00
Dump Trucks Idling at Drying Area[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Dump Trucks Traveling to Landfill[3]	1.74	1.67	9.97	11.12	0.00	1.28	1.23	0.87	0.84	5.01	5.59	0.00	0.64	0.62
Dump Trucks Idling at Landfill[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Unloading/Loading														
Clamshell Dredge	0.17	0.16	1.61	5.87	0.38	0.14	0.09	0.09	0.08	0.81	2.95	0.19	0.07	0.05
Barge Equipment	0.14	0.13	0.30	1.40	0.09	0.10	0.09	0.07	0.07	0.15	0.70	0.05	0.05	0.05
D-6 Dozer	0.14	0.14	0.33	1.21	0.13	0.11	0.10	0.07	0.07	0.17	0.61	0.07	0.05	0.05
Loader	0.21	0.21	0.42	1.36	0.13	0.12	0.12	0.11	0.10	0.21	0.69	0.07	0.06	0.06
Support Boat	0.06	0.05	0.09	0.50	0.04	0.04	0.04	0.03	0.03	0.04	0.25	0.02	0.02	0.02
Total	24	23	74	291	19	17	15	16	16	45	187	12	11	10

Notes:

[1] Emissions (tons) = Total Fuel Usage (in gals)/1000 x Emission Factor (lbs/1000 gals of fuel) x 0.0005 tons/lb

[2] Particulate matter emission factors were not available, so emission factors for support boats was used.

[3] Emissions (tons) = Vehicle Miles Traveled x Emission Factor (in grams/mile) x 0.0022 lbs/gram x 0.0005 tons/lb

[4] Emissions (tons) = Hours of Idling x Emission Factor (in grams/hour) x 0.0022 lbs/gram x 0.0005 tons/lb

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 16 - Total Dredging-Related Emissions for Option C

Prepared By: I. Edmonds-Hess
Date Prepared: 4/14/99
Checked By: L. Spurgeon

Table 16
Total Dredging-Related Emissions for Option C

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Dredging														
Clamshell Dredge	3.45	3.31	32.57	118.77	7.74	2.92	1.90	2.02	1.94	19.05	69.48	4.53	1.71	1.11
Anchor Tug	1.50	1.44	2.31	13.42	0.94	1.09	1.04	0.88	0.85	1.35	7.85	0.55	0.64	0.61
Barge Equipment	1.38	1.32	3.04	14.12	0.93	0.99	0.95	0.81	0.77	1.78	8.26	0.54	0.58	0.56
Support Boat	0.57	0.55	0.88	5.09	0.36	0.41	0.40	0.33	0.32	0.51	2.98	0.21	0.24	0.23
Survey Boat[2]	2.25	2.16	1.75	4.25	0.34	0.41	0.40	1.32	1.26	1.02	2.49	0.20	0.24	0.23
Alcatraz Disposal Site														
Transport & Unloading														
Tug Boat (Single Screw)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ocean Disposal Site														
Transport & Unloading														
Tug Boat (Double Screw)	13.16	12.63	20.22	117.36	8.21	9.50	9.12	10.03	9.63	15.41	89.43	6.25	7.24	6.95
Barge Equipment	0.07	0.07	0.17	0.77	0.05	0.05	0.05	0.06	0.05	0.13	0.59	0.04	0.04	0.04
Hamilton Wetland Restoration Site														
Transport														
Tug Boat (Double Screw)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unloading														
Hydraulic Unloader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Booster Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Work Tug	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Support Boat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 16 - Total Dredging-Related Emissions for Option C

Prepared By: I. Edmonds-Hess
Date Prepared: 4/14/99
Checked By: L. Spurgeon

Table 16
Total Dredging-Related Emissions for Option C

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Altamont Landfill														
Transport														
Tug Boat (Single Screw)	0.36	0.35	0.55	3.21	0.22	0.26	0.25	0.18	0.17	0.28	1.61	0.11	0.13	0.13
Barge Equipment	0.05	0.04	0.10	0.48	0.03	0.03	0.03	0.02	0.02	0.05	0.24	0.02	0.02	0.02
Dump Trucks Traveling to Drying Area[3]	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00
Dump Trucks Idling at Drying Area[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Dump Trucks Traveling to Landfill[3]	1.74	1.67	9.97	11.12	0.00	1.28	1.23	0.87	0.84	5.01	5.59	0.00	0.64	0.62
Dump Trucks Idling at Landfill[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Unloading/Loading														
Clamshell Dredge	0.17	0.16	1.61	5.87	0.38	0.14	0.09	0.09	0.08	0.81	2.95	0.19	0.07	0.05
Barge Equipment	0.14	0.13	0.30	1.40	0.09	0.10	0.09	0.07	0.07	0.15	0.70	0.05	0.05	0.05
D-6 Dozer	0.14	0.14	0.33	1.21	0.13	0.11	0.10	0.07	0.07	0.17	0.61	0.07	0.05	0.05
Loader	0.21	0.21	0.42	1.36	0.13	0.12	0.12	0.11	0.10	0.21	0.69	0.07	0.06	0.06
Support Boat	0.06	0.05	0.09	0.50	0.04	0.04	0.04	0.03	0.03	0.04	0.25	0.02	0.02	0.02
Total	25	24	75	299	20	17	16	17	16	46	194	13	12	11

Notes:

[1] Emissions (tons) = Total Fuel Usage (in gals)/1000 x Emission Factor (lbs/1000 gals of fuel) x 0.0005 tons/lb

[2] Particulate matter emission factors were not available, so emission factors for support boats was used.

[3] Emissions (tons) = Vehicle Miles Traveled x Emission Factor (in grams/mile) x 0.0022 lbs/gram x 0.0005 tons/lb

[4] Emissions (tons) = Hours of Idling x Emission Factor (in grams/hour) x 0.0022 lbs/gram x 0.0005 tons/lb

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 17 - Total Dredging-Related Emissions for Option D

Prepared By: I. Edmonds-Hess
Date Prepared: 4/15/99
Checked By: L. Spurgeon

Table 17
Total Dredging-Related Emissions for Option D

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Dredging														
Clamshell Dredge	3.45	3.31	32.57	118.77	7.74	2.92	1.90	2.02	1.94	19.05	69.48	4.53	1.71	1.11
Anchor Tug	1.50	1.44	2.31	13.42	0.94	1.09	1.04	0.88	0.85	1.35	7.85	0.55	0.64	0.61
Barge Equipment	1.38	1.32	3.04	14.12	0.93	0.99	0.95	0.81	0.77	1.78	8.26	0.54	0.58	0.56
Support Boat	0.57	0.55	0.88	5.09	0.36	0.41	0.40	0.33	0.32	0.51	2.98	0.21	0.24	0.23
Survey Boat[2]	2.25	2.16	1.75	4.25	0.34	0.41	0.40	1.32	1.26	1.02	2.49	0.20	0.24	0.23
Alcatraz Disposal Site														
Transport & Unloading														
Tug Boat (Single Screw)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ocean Disposal Site														
Transport & Unloading														
Tug Boat (Double Screw)	1.93	1.85	2.97	17.21	1.20	1.39	1.34	1.49	1.43	2.29	13.29	0.93	1.08	1.03
Barge Equipment	0.01	0.01	0.02	0.11	0.01	0.01	0.01	0.01	0.01	0.02	0.09	0.01	0.01	0.01
Hamilton Wetland Restoration Site														
Transport														
Tug Boat (Double Screw)	6.54	6.27	10.04	58.27	4.08	4.72	4.53	4.97	4.77	7.63	44.29	3.10	3.59	3.44
Barge Equipment	0.18	0.17	0.39	1.83	0.12	0.13	0.12	0.14	0.13	0.30	1.39	0.09	0.10	0.09
Unloading														
Hydraulic Unloader	0.22	0.21	2.00	7.65	0.50	0.19	0.12	0.17	0.16	1.52	5.82	0.38	0.14	0.09
Booster Pump	0.44	0.43	4.20	15.31	1.00	0.38	0.25	0.34	0.32	3.19	11.63	0.76	0.29	0.19
Work Tug	0.15	0.14	0.22	1.31	0.09	0.11	0.10	0.11	0.11	0.17	0.99	0.07	0.08	0.08
Generator	0.02	0.02	0.08	0.14	0.02	0.01	0.01	0.02	0.02	0.06	0.11	0.01	0.01	0.01
Support Boat	0.06	0.05	0.09	0.50	0.03	0.04	0.04	0.04	0.04	0.06	0.38	0.03	0.03	0.03

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 17 - Total Dredging-Related Emissions for Option D

Prepared By: I. Edmonds-Hess
Date Prepared: 4/15/99
Checked By: L. Spurgeon

Table 17
Total Dredging-Related Emissions for Option D

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Altamont Landfill														
Transport														
Tug Boat (Single Screw)	0.36	0.35	0.55	3.21	0.22	0.26	0.25	0.18	0.17	0.28	1.61	0.11	0.13	0.13
Barge Equipment	0.05	0.04	0.10	0.48	0.03	0.03	0.03	0.02	0.02	0.05	0.24	0.02	0.02	0.02
Dump Trucks Traveling to Drying Area[3]	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00
Dump Trucks Idling at Drying Area[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Dump Trucks Traveling to Landfill[3]	1.74	1.67	9.97	11.12	0.00	1.28	1.23	0.87	0.84	5.01	5.59	0.00	0.64	0.62
Dump Trucks Idling at Landfill[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Unloading/Loading														
Clamshell Dredge	0.17	0.16	1.61	5.87	0.38	0.14	0.09	0.09	0.08	0.81	2.95	0.19	0.07	0.05
Barge Equipment	0.14	0.13	0.30	1.40	0.09	0.10	0.09	0.07	0.07	0.15	0.70	0.05	0.05	0.05
D-6 Dozer	0.14	0.14	0.33	1.21	0.13	0.11	0.10	0.07	0.07	0.17	0.61	0.07	0.05	0.05
Loader	0.21	0.21	0.42	1.36	0.13	0.12	0.12	0.11	0.10	0.21	0.69	0.07	0.06	0.06
Support Boat	0.06	0.05	0.09	0.50	0.04	0.04	0.04	0.03	0.03	0.04	0.25	0.02	0.02	0.02
Total	22	21	75	284	18	15	13	14	14	46	182	12	10	9

Notes:

[1] Emissions (tons) = Total Fuel Usage (in gals)/1000 x Emission Factor (lbs/1000 gals of fuel) x 0.0005 tons/lb

[2] Particulate matter emission factors were not available, so emission factors for support boats was used.

[3] Emissions (tons) = Vehicle Miles Traveled x Emission Factor (in grams/mile) x 0.0022 lbs/gram x 0.0005 tons/lb

[4] Emissions (tons) = Hours of Idling x Emission Factor (in grams/hour) x 0.0022 lbs/gram x 0.0005 tons/lb

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 18 - Total Dredging-Related Emissions for Option E

Prepared By: I. Edmonds-Hess
Date Prepared: 4/15/99
Checked By: L. Spurgeon

Table 18
Total Dredging-Related Emissions for Option E

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Dredging														
Clamshell Dredge	3.45	3.31	32.57	118.77	7.74	2.92	1.90	2.02	1.94	19.05	69.48	4.53	1.71	1.11
Anchor Tug	1.50	1.44	2.31	13.42	0.94	1.09	1.04	0.88	0.85	1.35	7.85	0.55	0.64	0.61
Barge Equipment	1.38	1.32	3.04	14.12	0.93	0.99	0.95	0.81	0.77	1.78	8.26	0.54	0.58	0.56
Support Boat	0.57	0.55	0.88	5.09	0.36	0.41	0.40	0.33	0.32	0.51	2.98	0.21	0.24	0.23
Survey Boat[2]	2.25	2.16	1.75	4.25	0.34	0.41	0.40	1.32	1.26	1.02	2.49	0.20	0.24	0.23
Alcatraz Disposal Site														
Transport & Unloading														
Tug Boat (Single Screw)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ocean Disposal Site														
Transport & Unloading														
Tug Boat (Double Screw)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hamilton Wetland Restoration Site														
Transport														
Tug Boat (Double Screw)	7.54	7.24	11.58	67.24	4.70	5.45	5.23	5.75	5.52	8.83	51.23	3.58	4.15	3.98
Barge Equipment	0.21	0.20	0.46	2.11	0.14	0.15	0.14	0.16	0.15	0.35	1.61	0.11	0.11	0.11
Unloading														
Hydraulic Unloader	0.26	0.25	2.31	8.83	0.58	0.22	0.14	0.20	0.19	1.76	6.73	0.44	0.17	0.11
Booster Pump	0.51	0.49	4.84	17.66	1.15	0.43	0.28	0.39	0.38	3.69	13.46	0.88	0.33	0.22
Work Tug	0.17	0.16	0.26	1.51	0.11	0.12	0.12	0.13	0.12	0.20	1.15	0.08	0.09	0.09
Generator	0.03	0.02	0.10	0.16	0.02	0.02	0.02	0.02	0.02	0.07	0.12	0.01	0.01	0.01
Support Boat	0.06	0.06	0.10	0.57	0.04	0.05	0.04	0.05	0.05	0.08	0.44	0.03	0.04	0.03

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 18 - Total Dredging-Related Emissions for Option E

Prepared By: I. Edmonds-Hess
Date Prepared: 4/15/99
Checked By: L. Spurgeon

Table 18
Total Dredging-Related Emissions for Option E

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Altamont Landfill														
Transport														
Tug Boat (Single Screw)	0.36	0.35	0.55	3.21	0.22	0.26	0.25	0.18	0.17	0.28	1.61	0.11	0.13	0.13
Barge Equipment	0.05	0.04	0.10	0.48	0.03	0.03	0.03	0.02	0.02	0.05	0.24	0.02	0.02	0.02
Dump Trucks Traveling to Drying Area[3]	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00
Dump Trucks Idling at Drying Area[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Dump Trucks Traveling to Landfill[3]	1.74	1.67	9.97	11.12	0.00	1.28	1.23	0.87	0.84	5.01	5.59	0.00	0.64	0.62
Dump Trucks Idling at Landfill[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Unloading/Loading														
Clamshell Dredge	0.17	0.16	1.61	5.87	0.38	0.14	0.09	0.09	0.08	0.81	2.95	0.19	0.07	0.05
Barge Equipment	0.14	0.13	0.30	1.40	0.09	0.10	0.09	0.07	0.07	0.15	0.70	0.05	0.05	0.05
D-6 Dozer	0.14	0.14	0.33	1.21	0.13	0.11	0.10	0.07	0.07	0.17	0.61	0.07	0.05	0.05
Loader	0.21	0.21	0.42	1.36	0.13	0.12	0.12	0.11	0.10	0.21	0.69	0.07	0.06	0.06
Support Boat	0.06	0.05	0.09	0.50	0.04	0.04	0.04	0.03	0.03	0.04	0.25	0.02	0.02	0.02
Total	21	20	74	279	18	14	13	14	13	46	179	12	9	8

Notes:

[1] Emissions (tons) = Total Fuel Usage (in gals)/1000 x Emission Factor (lbs/1000 gals of fuel) x 0.0005 tons/lb

[2] Particulate matter emission factors were not available, so emission factors for support boats was used.

[3] Emissions (tons) = Vehicle Miles Traveled x Emission Factor (in grams/mile) x 0.0022 lbs/gram x 0.0005 tons/lb

[4] Emissions (tons) = Hours of Idling x Emission Factor (in grams/hour) x 0.0022 lbs/gram x 0.0005 tons/lb

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 19 - Total Dredging-Related Emissions for Option F

Prepared By: I. Edmonds-Hess
Date Prepared: 4/15/99
Checked By: L. Spurgeon

Table 19
Total Dredging-Related Emissions for Option F

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Dredging														
Clamshell Dredge	3.45	3.31	32.57	118.77	7.74	2.92	1.90	2.02	1.94	19.05	69.48	4.53	1.71	1.11
Anchor Tug	1.50	1.44	2.31	13.42	0.94	1.09	1.04	0.88	0.85	1.35	7.85	0.55	0.64	0.61
Barge Equipment	1.38	1.32	3.04	14.12	0.93	0.99	0.95	0.81	0.77	1.78	8.26	0.54	0.58	0.56
Support Boat	0.57	0.55	0.88	5.09	0.36	0.41	0.40	0.33	0.32	0.51	2.98	0.21	0.24	0.23
Survey Boat[2]	2.25	2.16	1.75	4.25	0.34	0.41	0.40	1.32	1.26	1.02	2.49	0.20	0.24	0.23
Alcatraz Disposal Site														
Transport & Unloading														
Tug Boat (Single Screw)	0.78	0.75	1.20	6.97	0.49	0.56	0.54	0.60	0.58	0.93	5.38	0.38	0.44	0.42
Barge Equipment	0.03	0.02	0.06	0.26	0.02	0.02	0.02	0.02	0.02	0.04	0.20	0.01	0.01	0.01
Ocean Disposal Site														
Transport & Unloading														
Tug Boat (Double Screw)	6.84	6.57	10.51	61.03	4.27	4.94	4.74	4.10	3.94	6.30	36.56	2.56	2.96	2.84
Barge Equipment	0.04	0.04	0.09	0.40	0.03	0.03	0.03	0.02	0.02	0.05	0.22	0.01	0.02	0.02
Hamilton Wetland Restoration Site														
Transport														
Tug Boat (Double Screw)	2.61	2.51	4.02	23.31	1.63	1.89	1.81	2.61	2.51	4.02	23.31	1.63	1.89	1.81
Barge Equipment	0.07	0.07	0.16	0.73	0.05	0.05	0.05	0.07	0.07	0.16	0.73	0.05	0.05	0.05
Unloading														
Hydraulic Unloader	0.09	0.09	0.80	3.06	0.20	0.08	0.05	0.09	0.09	0.80	3.06	0.20	0.08	0.05
Booster Pump	0.18	0.17	1.68	6.12	0.40	0.15	0.10	0.18	0.17	1.68	6.12	0.40	0.15	0.10
Work Tug	0.06	0.06	0.09	0.52	0.04	0.04	0.04	0.06	0.06	0.09	0.52	0.04	0.04	0.04
Generator	0.01	0.01	0.03	0.06	0.01	0.01	0.01	0.01	0.01	0.03	0.06	0.01	0.01	0.01
Support Boat	0.02	0.02	0.03	0.20	0.01	0.02	0.02	0.02	0.02	0.03	0.20	0.01	0.02	0.02

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 19 - Total Dredging-Related Emissions for Option F

Prepared By: I. Edmonds-Hess
Date Prepared: 4/15/99
Checked By: L. Spurgeon

Table 19
Total Dredging-Related Emissions for Option F

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Altamont Landfill														
Transport														
Tug Boat (Single Screw)	0.36	0.35	0.55	3.21	0.22	0.26	0.25	0.18	0.17	0.28	1.61	0.11	0.13	0.13
Barge Equipment	0.05	0.04	0.10	0.48	0.03	0.03	0.03	0.02	0.02	0.05	0.24	0.02	0.02	0.02
Dump Trucks Traveling to Drying Area[3]	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00
Dump Trucks Idling at Drying Area[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Dump Trucks Traveling to Landfill[3]	1.74	1.67	9.97	11.12	0.00	1.28	1.23	0.87	0.84	5.01	5.59	0.00	0.64	0.62
Dump Trucks Idling at Landfill[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Unloading/Loading														
Clamshell Dredge	0.17	0.16	1.61	5.87	0.38	0.14	0.09	0.09	0.08	0.81	2.95	0.19	0.07	0.05
Barge Equipment	0.14	0.13	0.30	1.40	0.09	0.10	0.09	0.07	0.07	0.15	0.70	0.05	0.05	0.05
D-6 Dozer	0.14	0.14	0.33	1.21	0.13	0.11	0.10	0.07	0.07	0.17	0.61	0.07	0.05	0.05
Loader	0.21	0.21	0.42	1.36	0.13	0.12	0.12	0.11	0.10	0.21	0.69	0.07	0.06	0.06
Support Boat	0.06	0.05	0.09	0.50	0.04	0.04	0.04	0.03	0.03	0.04	0.25	0.02	0.02	0.02
Total	23	22	73	284	18	16	14	15	14	45	180	12	10	9

Notes:

[1] Emissions (tons) = Total Fuel Usage (in gals)/1000 x Emission Factor (lbs/1000 gals of fuel) x 0.0005 tons/lb

[2] Particulate matter emission factors were not available, so emission factors for support boats was used.

[3] Emissions (tons) = Vehicle Miles Traveled x Emission Factor (in grams/mile) x 0.0022 lbs/gram x 0.0005 tons/lb

[4] Emissions (tons) = Hours of Idling x Emission Factor (in grams/hour) x 0.0022 lbs/gram x 0.0005 tons/lb

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 20 - Total Dredging-Related Emissions for Option G

Prepared By: I. Edmonds-Hess
Date Prepared: 4/15/99
Checked By: L. Spurgeon

Table 20
Total Dredging-Related Emissions for Option G

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Dredging														
Clamshell Dredge	3.45	3.31	32.57	118.77	7.74	2.92	1.90	2.02	1.94	19.05	69.48	4.53	1.71	1.11
Anchor Tug	1.50	1.44	2.31	13.42	0.94	1.09	1.04	0.88	0.85	1.35	7.85	0.55	0.64	0.61
Barge Equipment	1.38	1.32	3.04	14.12	0.93	0.99	0.95	0.81	0.77	1.78	8.26	0.54	0.58	0.56
Support Boat	0.57	0.55	0.88	5.09	0.36	0.41	0.40	0.33	0.32	0.51	2.98	0.21	0.24	0.23
Survey Boat[2]	2.25	2.16	1.75	4.25	0.34	0.41	0.40	1.32	1.26	1.02	2.49	0.20	0.24	0.23
Alcatraz Disposal Site														
Transport & Unloading														
Tug Boat (Single Screw)	0.50	0.48	0.77	4.45	0.31	0.36	0.35	0.50	0.48	0.78	4.50	0.31	0.36	0.35
Barge Equipment	0.02	0.02	0.04	0.17	0.01	0.01	0.01	0.02	0.02	0.04	0.17	0.01	0.01	0.01
Ocean Disposal Site														
Transport & Unloading														
Tug Boat (Double Screw)	6.84	6.57	10.51	61.03	4.27	4.94	4.74	4.10	3.94	6.30	36.56	2.56	2.96	2.84
Barge Equipment	0.04	0.04	0.09	0.40	0.03	0.03	0.03	0.02	0.02	0.05	0.22	0.01	0.02	0.02
Hamilton Wetland Restoration Site														
Transport														
Tug Boat (Double Screw)	2.92	2.80	4.48	26.00	1.82	2.11	2.02	2.67	2.56	4.10	23.79	1.66	1.93	1.85
Barge Equipment	0.08	0.08	0.18	0.82	0.05	0.06	0.06	0.07	0.07	0.16	0.75	0.05	0.05	0.05
Unloading														
Hydraulic Unloader	0.10	0.10	0.89	3.41	0.22	0.08	0.05	0.09	0.09	0.82	3.12	0.20	0.08	0.05
Booster Pump	0.20	0.19	1.87	6.83	0.45	0.17	0.11	0.18	0.17	1.71	6.25	0.41	0.15	0.10
Work Tug	0.07	0.06	0.10	0.58	0.04	0.05	0.05	0.06	0.06	0.09	0.53	0.04	0.04	0.04
Generator	0.01	0.01	0.04	0.06	0.01	0.01	0.01	0.01	0.01	0.03	0.06	0.01	0.01	0.01
Support Boat	0.02	0.02	0.04	0.22	0.02	0.02	0.02	0.02	0.02	0.03	0.20	0.01	0.02	0.02

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 20 - Total Dredging-Related Emissions for Option G

Prepared By: I. Edmonds-Hess
Date Prepared: 4/15/99
Checked By: L. Spurgeon

Table 20
Total Dredging-Related Emissions for Option G

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Altamont Landfill														
Transport														
Tug Boat (Single Screw)	0.36	0.35	0.55	3.21	0.22	0.26	0.25	0.18	0.17	0.28	1.61	0.11	0.13	0.13
Barge Equipment	0.05	0.04	0.10	0.48	0.03	0.03	0.03	0.02	0.02	0.05	0.24	0.02	0.02	0.02
Dump Trucks Traveling to Drying Area[3]	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00
Dump Trucks Idling at Drying Area[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Dump Trucks Traveling to Landfill[3]	1.74	1.67	9.97	11.12	0.00	1.28	1.23	0.87	0.84	5.01	5.59	0.00	0.64	0.62
Dump Trucks Idling at Landfill[4]	0.04	0.04	0.38	0.18	0.00	0.01	0.01	0.02	0.02	0.19	0.09	0.00	0.00	0.00
Unloading/Loading														
Clamshell Dredge	0.17	0.16	1.61	5.87	0.38	0.14	0.09	0.09	0.08	0.81	2.95	0.19	0.07	0.05
Barge Equipment	0.14	0.13	0.30	1.40	0.09	0.10	0.09	0.07	0.07	0.15	0.70	0.05	0.05	0.05
D-6 Dozer	0.14	0.14	0.33	1.21	0.13	0.11	0.10	0.07	0.07	0.17	0.61	0.07	0.05	0.05
Loader	0.21	0.21	0.42	1.36	0.13	0.12	0.12	0.11	0.10	0.21	0.69	0.07	0.06	0.06
Support Boat	0.06	0.05	0.09	0.50	0.04	0.04	0.04	0.03	0.03	0.04	0.25	0.02	0.02	0.02
Total	23	22	74	285	19	16	14	15	14	45	180	12	10	9

Notes:

[1] Emissions (tons) = Total Fuel Usage (in gals)/1000 x Emission Factor (lbs/1000 gals of fuel) x 0.0005 tons/lb

[2] Particulate matter emission factors were not available, so emission factors for support boats was used.

[3] Emissions (tons) = Vehicle Miles Traveled x Emission Factor (in grams/mile) x 0.0022 lbs/gram x 0.0005 tons/lb

[4] Emissions (tons) = Hours of Idling x Emission Factor (in grams/hour) x 0.0022 lbs/gram x 0.0005 tons/lb

Source: Parsons Brinckerhoff, 1999.

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 21 - Total Dredging-Related Emissions for Option H

Prepared By: I. Edmonds-Hess
Date Prepared: 4/15/99
Checked By: L. Spurgeon

Table 21
Total Dredging-Related Emissions for Option H

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Dredging														
Clamshell Dredge	3.45	3.31	32.57	118.77	7.74	2.92	1.90	2.02	1.94	19.05	69.48	4.53	1.71	1.11
Anchor Tug	1.50	1.44	2.31	13.42	0.94	1.09	1.04	0.88	0.85	1.35	7.85	0.55	0.64	0.61
Barge Equipment	1.38	1.32	3.04	14.12	0.93	0.99	0.95	0.81	0.77	1.78	8.26	0.54	0.58	0.56
Support Boat	0.57	0.55	0.88	5.09	0.36	0.41	0.40	0.33	0.32	0.51	2.98	0.21	0.24	0.23
Survey Boat[2]	2.25	2.16	1.75	4.25	0.34	0.41	0.40	1.32	1.26	1.02	2.49	0.20	0.24	0.23
Alcatraz Disposal Site														
Transport & Unloading														
Tug Boat (Single Screw)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ocean Disposal Site														
Transport & Unloading														
Tug Boat (Double Screw)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hamilton Wetland Restoration Site														
Transport														
Tug Boat (Double Screw)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unloading														
Hydraulic Unloader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Booster Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Work Tug	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Support Boat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
Subject: Table 21 - Total Dredging-Related Emissions for Option H

Prepared By: I. Edmonds-Hess
Date Prepared: 4/15/99
Checked By: L. Spurgeon

Table 21
Total Dredging-Related Emissions for Option H

Activity/Equipment	Total Emissions[1] for the Upper Dredge Limit (in tons)							Total Emissions[1] for the Lower Dredge Limit (in tons)						
	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}	TOG	ROG	CO	NO_x	SO_2	PM	PM_{10}
Altamont Landfill														
Transport														
Tug Boat (Single Screw)	1.44	1.38	2.21	12.84	0.90	1.04	1.00	0.84	0.81	1.29	7.51	0.53	0.61	0.58
Barge Equipment	0.19	0.18	0.41	1.92	0.13	0.14	0.13	0.11	0.11	0.24	1.12	0.07	0.08	0.08
Dump Trucks Traveling to Drying Area[3]	0.02	0.02	0.11	0.12	0.00	0.01	0.01	0.01	0.01	0.07	0.07	0.00	0.01	0.01
Dump Trucks Idling at Drying Area[4]	0.17	0.17	1.51	0.74	0.00	0.03	0.03	0.10	0.10	0.88	0.43	0.00	0.02	0.02
Dump Trucks Traveling to Landfill[3]	7.03	6.74	40.33	44.98	0.00	5.19	4.97	4.11	3.94	23.59	26.31	0.00	3.03	2.91
Dump Trucks Idling at Landfill[4]	0.18	0.17	1.52	0.74	0.00	0.03	0.03	0.10	0.10	0.89	0.43	0.00	0.02	0.02
Unloading/Loading														
Clamshell Dredge	0.68	0.65	6.42	23.43	1.53	0.58	0.38	0.40	0.38	3.76	13.71	0.89	0.34	0.22
Barge Equipment	0.54	0.52	1.20	5.57	0.37	0.39	0.38	0.32	0.31	0.70	3.26	0.21	0.23	0.22
D-6 Dozer	0.57	0.55	1.33	4.83	0.53	0.43	0.41	0.34	0.32	0.78	2.83	0.31	0.25	0.24
Loader	0.85	0.82	1.67	5.45	0.53	0.50	0.48	0.50	0.48	0.98	3.19	0.31	0.29	0.28
Support Boat	0.23	0.22	0.35	2.01	0.14	0.16	0.16	0.13	0.13	0.20	1.18	0.08	0.10	0.09
Total	21	20	98	258	14	14	13	12	12	57	151	8	8	7

Notes:

[1] Emissions (tons) = Total Fuel Usage (in gals)/1000 x Emission Factor (lbs/1000 gals of fuel) x 0.0005 tons/lb

[2] Particulate matter emission factors were not available, so emission factors for support boats was used.

[3] Emissions (tons) = Vehicle Miles Traveled x Emission Factor (in grams/mile) x 0.0022 lbs/gram x 0.0005 tons/lb

[4] Emissions (tons) = Hours of Idling x Emission Factor (in grams/hour) x 0.0022 lbs/gram x 0.0005 tons/lb

Source: Parsons Brinckerhoff, 1999.

APPENDIX N

CONCEPTUAL MITIGATION PLAN FOR SPECIAL AQUATIC SITES

San Francisco – Oakland Bay Bridge
East Span Seismic Safety Project

EA 012000
Caltrans Contract 04A0148
Task Order 180.10

04-SF-80 KP 12.2/KP 14.3
04-ALA-80 KP 0.0/KP 2.1

Conceptual Mitigation Plan for Special Aquatic Sites

November 2000
Revision 6

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PROJECT PURPOSE

Caltrans proposes to replace the East Span of the San Francisco-Oakland Bay Bridge (SFOBB) between Yerba Buena Island (YBI) in the City and County of San Francisco and Oakland in Alameda County. The Federal Highway Administration (FHWA) is the federal lead agency pursuant to the National Environmental Policy Act (NEPA). The purpose of the project is to provide a seismically upgraded vehicular crossing for current and future users. The N-6 Replacement Alternative, the northernmost of the replacement alternatives, is Caltrans' Preferred Alternative. This plan only addresses the mitigation for special aquatic sites for Replacement Alternative N-6. Caltrans has developed this plan through a review of project impacts, mitigation options and consultation with regulatory agencies.

PROJECT IMPACTS

Potential impacts of the N-6 Replacement Alternative are summarized in Table 1-1. The assessment of construction impacts is based on a worst case scenario utilizing a likely construction methodology. The special aquatic sites affected by Replacement Alternative N-6 are located at the Oakland Touchdown and at Clipper Cove on the north side of YBI. The N-6 Replacement Alternative will permanently impact 1.36 hectares (3.36 acres) of sand flats and 0.22 hectares (0.55 acres) of eelgrass (*Zostera marina*). At the Oakland Touchdown, permanent impacts will be caused by dredging for the barge access channel, the placement of engineered fill for the westbound roadway and the Caltrans maintenance road, and shading from the east and westbound bridge structures. At Clipper Cove, permanent impacts will be caused by the construction of barge dock 'A'. In addition, the N-6 Replacement Alternative will temporarily impact 0.69 hectares (1.70 acres) of sand flats and 0.01 hectares (0.02 acres) of eelgrass. At the Oakland Touchdown, temporary impacts will be caused by the placement of a "geotube", a large high density polyethylene tube filled with excavated material used for dewatering purposes, and increased turbidity generated by dredging, pile-driving, prop wash and mud boils. No temporary impacts to eelgrass or sand flats are expected at YBI.

Caltrans will avoid potential impacts to two isolated non-tidal wetlands at the Oakland Touchdown and tidal wetlands at Clipper Cove by designating them as environmentally sensitive areas (ESAs) during construction. Caltrans will also avoid potential impacts to eelgrass at the Oakland Touchdown and YBI that are located outside the direct impact zone by designating them as ESAs during construction.

Caltrans proposes a plan to avoid and minimize impacts to wetlands, sand flats and eelgrass in the project area, and compensate for unavoidable temporary and permanent impacts. The mitigation concept for unavoidable impacts has two objectives. The first objective is to mitigate and/or restore impacted areas within the project limits to the maximum extent practicable. The second objective is to mitigate off-site to compensate for unavoidable impacts that cannot be mitigated in the project area.

AVOIDANCE MEASURES

Caltrans will implement measures on-site to avoid potential impacts. These measures include:

- Installing fencing around non-tidal wetlands and marking them as ESAs to avoid impacts during construction; and
- Marking the eelgrass beds and tidal wetlands outside the direct impact zone as ESAs to avoid additional impacts during construction.

MINIMIZATION MEASURES

Caltrans will also implement measures on-site to minimize potential impacts. These measures include:

- Installing turbidity curtains to contain and reduce turbidity impacts to eelgrass;
- Narrowing part of the barge access channel from the original dimensions identified in the Dredged Materials Management Plan (DMMP) to a smaller channel that reduces permanent and temporary impacts to eelgrass beds;
- Using a geotube as a dewatering berm rather than engineered fill; and
- Using removable trestles for construction access.

ON-SITE MITIGATION

Caltrans will implement measures on-site to restore special aquatic sites affected during construction. Restoration measures include:

- Harvesting approximately 0.22 hectares (0.54 acres) of eelgrass from the footprint of the barge access channel, planting test plots in adjacent eelgrass beds and monitoring to evaluate performance;
- Restoring up to approximately 0.70 hectares (1.73 acres) of the barge access channel with stockpiled dredge material and excavated sand to facilitate eelgrass colonization and possibly replanting with eelgrass;
- Restoring approximately 0.69 hectares (1.70 acres) of sand flats that are temporarily affected by the placement of a geotube or mud boils from engineered fill;
- Constructing rock slope protection to allow sand to accrete over the rock in areas subject to tidal action. Slope gradients will be 1:3 (V:H) at the toe of the slope and transitioning to a 1:2 gradient at mid-slope; and
- Capping rock slope protection areas with soil above the limits of tidal action to provide a medium to support growth of native upland plants.

OFF-SITE MITIGATION

Tidal Marsh and Mudflat Creation and Enhancement

Permanent impacts to sand flats and eelgrass beds will be further mitigated by creation of a tidal marsh ecosystem. This out-of-kind mitigation will provide enhanced functions and values relative to the affected special aquatic sites. The tidal marsh ecosystem will include creation of

new mudflats, tidal channels, and tidal marsh and enhancement of existing wetlands and uplands. The synergistic effect of these complementary habitats will provide greater foraging, roosting, and breeding opportunities for many of the species that utilize the affected special aquatic sites.

Caltrans is considering two sites for creation of an aquatic ecosystem, although it will only select one site. The Breuner property, described below, is the preferred mitigation site.

- **Breuner Property:** Bay Area Wetlands, L.L.C. currently owns this property. Caltrans proposes to create approximately 4.73 hectares (11.70 acres) of tidal marsh ecosystem at this site. The estimated cost is approximately two million dollars including acquisition of the mitigation rights, fill removal, grading, planting and monitoring. The Breuner property is the only suitable site with a landowner that intends to use its property for habitat creation, restoration and enhancement.
- **Liquid Gold Property:** Southern Pacific Transportation Company (SPTCo) currently owns this property. Caltrans could create approximately 4.73 hectares (11.70 acres) of a tidal marsh ecosystem at this site. Estimated costs include three to five million dollars for acquisition and approximately one million dollars for fill removal, grading, planting and monitoring.

1.1 PROJECT PURPOSE

The purpose of the SFOBB East Span Project is to provide a seismically upgraded vehicular crossing for current and future users between Yerba Buena Island and Oakland. A maximum credible earthquake (MCE) on either the San Andreas or Hayward faults is expected to inflict far greater damage to the East Span than it experienced as a result of the 1989 Loma Prieta earthquake. On the existing SFOBB East Span, a MCE could cause a multi-span collapse, potentially resulting in numerous casualties and requiring months to reopen the bridge or years to build a replacement. The replacement bridge will be designed not only to withstand an MCE but also to provide necessary post-disaster service and assist in emergency response efforts. The replacement bridge will also be upgraded to meet current operational and safety standards to the maximum extent feasible.

1.2 PROPOSED PROJECT

Caltrans worked closely with the Metropolitan Transportation Commission (MTC) Bay Bridge Task Force and the Engineering and Design Advisory Panel (EDAP) to develop the proposed project. Consistent with MTC's recommendations, Caltrans' Preferred Replacement alternative is the N-6 alignment just north of the existing bridge. The replacement bridge will consist of a concrete skyway that begins at the Oakland Touchdown area west of the SFOBB Toll Plaza (Figure 1-1). The skyway will connect to a steel, self-anchored suspension span just east of YBI. The self-anchored suspension bridge will span the navigation channel near YBI and connect to a concrete transition structure on YBI. The transition structure will then connect to the existing double deck configuration at the YBI tunnel.

Replacement Alternative N-6 will be approximately 3.6-kilometers-long (2.2-miles-long). A single tower will be located between the east and westbound structures and will support the self-anchored suspension span (Figure 1-2). The new East Span will include side-by-side bridge decks, separated by approximately 15.24 meters (50 feet). Each structure will have five 3.6-meter-wide (12-foot-wide) lanes and two 3-meter-wide (10-foot-wide) shoulders. As a public amenity, there will be a 4.73-meter-wide (15.5-foot-wide) bicycle and pedestrian path on the south side of the eastbound lane elevated 0.30-meter (one foot) above the roadway. The existing bridge will be dismantled after construction of the replacement bridge. The replacement bridge will not increase vehicle capacity within the transbay corridor, but will be operationally superior to the existing span due to the addition of shoulders.

1.3 DESCRIPTIONS OF THE AFFECTED SPECIAL AQUATIC SITES

The affected sand flats are located along the northern side of the Oakland Touchdown area beginning just west of Radio Point Beach and continuing to the west end of the Touchdown (Figure 1-3). The habitat value of the sand flats in the project area is diminished by the abrupt transitions with adjacent uplands and the lack of adjacent wetland habitats. The existing shoreline adjacent to these sand flats is protected with rock riprap and the transition to uplands is abrupt. These characteristics reduce the potential for species to utilize the sand flats in the project area for resting, breeding and foraging. A detailed description of the functions and values of sand flats is presented in Section Two.

The affected eelgrass beds are located at the outer margins of the sand flats along the north side of the Oakland Touchdown area and at Clipper Cove, north of Yerba Buena Island (Figures 1-3 and 1-4). These beds consist of widely scattered patches of eelgrass. This pattern is typical of eelgrass beds in San Francisco Bay and is a result of environmental stresses that may vary unpredictably over time and lead to intermittent emergence or loss of eelgrass patches from an area. These eelgrass patches are part of a larger complex that is one of the most extensive stands of eelgrass in the Bay (Merkel 2000).

The largest patches of eelgrass in the project area occur on the high points of sandy shoals north of the Oakland Touchdown. Other relatively large coalesced beds occur within Clipper Cove on a narrow band of silty sands adjacent to the deeper navigational basin. A detailed description of the functions and values of eelgrass beds is presented in Section Two.

1.4 IMPACT SUMMARY

Replacement Alternative N-6 will affect sand flats and eelgrass beds. These habitats are jurisdictional waters of the U.S. regulated under Sections 404 and 401 of the federal Clean Water Act. Wetlands, sand flats and eelgrass beds are also designated as special aquatic sites.

Table 1-1 summarizes the temporary and permanent impacts to sand flats and eelgrass beds. Approximately 1.36 hectares (3.36 acres) of sand flats and approximately 0.22 hectares (0.55 acres) of eelgrass beds will be permanently impacted. Approximately 0.69 hectares (1.70 acres) of sand flats and approximately 0.01 hectares (0.02 acres) of eelgrass beds will be temporarily impacted. The N-6 Replacement Alternative will not affect tidal or non-tidal wetlands.

Permanent impacts to eelgrass and sand flats at the Oakland Touchdown area will include:

- Dredging for the barge access channel (Figure 1-5);
- Engineered fill for the westbound roadway;
- Engineered fill for the maintenance road; and
- Shading from the bridge deck.

Permanent impacts to eelgrass at Yerba Buena Island will include:

- Construction of barge dock 'A' near Clipper Cove (Figure 1-6).

Because the water at the easternmost portion of the project area at the Oakland Touchdown is too shallow for construction barges, an access channel must be dredged. Dredging will affect stands of eelgrass (*Zostera marina*) (Figure 1-7). Barges are necessary to construct the piles, pile caps and bridge deck. Construction from land in this area is not feasible due to geologic conditions.

Engineered fill will be placed along the northwest side of the Oakland Touchdown area for the westbound roadway and the Caltrans maintenance road. This fill will permanently affect sand flats. In addition, permanent shading from the east and westbound bridge structures will permanently affect sand flats.

A temporary dock may be constructed at Clipper Cove to transport construction equipment, supplies and workers to and from the YBI project area. Although the dock is temporary, it will permanently affect a limited area of eelgrass along the margin of the Island when it is constructed.

Temporary impacts to eelgrass and sand flats at the Oakland Touchdown will include:

- Placement of a geotube for dewatering (Figure 1-8); and
- Increased turbidity due to prop wash from barges and tugboats, dredging, pile driving, and mud boils.

There will be no temporary impacts at Yerba Buena Island.

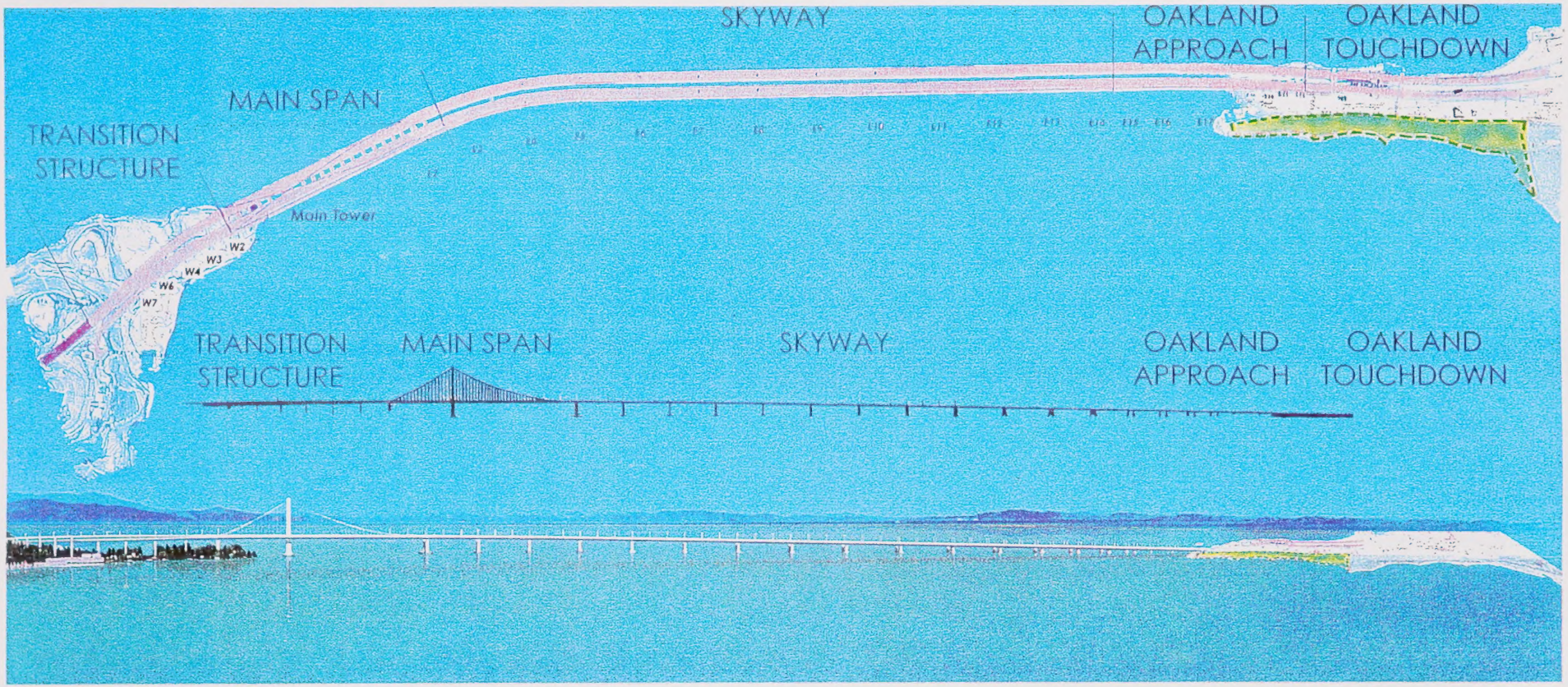
Temporary fill will consist of access trestles and a large, high-density polyethylene tube filled with excavated material, known as a geotube. The geotube will be placed north of the Oakland Touchdown area along the outside border of the work area to facilitate dewatering, installation of wick drains and placement of fill and surcharge for construction of the bridge approach. The geotube will be placed on sand flats, which may increase turbidity if fill material becomes suspended or if mud boils occur. The geotube is self-contained, with the ability to conform to the microtopography of the site. The geotube will help to minimize the displacement of sand flats and the high-density material will not erode, thereby minimizing turbidity.

Pile-supported trestles for temporary construction access will be constructed at the west end of the Oakland Touchdown. Because the access trestles will be constructed within the footprint of the dredged area, they will not result in any permanent impacts. However, pile driving to install the trestles may temporarily increase turbidity. Turbidity may also temporarily increase during dredging activities and later due to prop wash from barges and tugboats moving in and out of the barge access channel. Temporary impacts from turbidity are not expected at YBI.

Table 1-1

SUMMARY OF SPECIAL AQUATIC SITE IMPACTS

Type of Impact	Sand Flats hectares (acres)	Eelgrass hectares (acres)	Total hectares (acres)
Temporary	0.69 (1.70)	0.01 (0.02)	0.70 (1.72)
Permanent	1.36 (3.36)	0.22 (0.55)	1.58 (3.91)
Total	**2.05 (5.06)**	**0.23 (0.57)**	**2.28 (5.63)**



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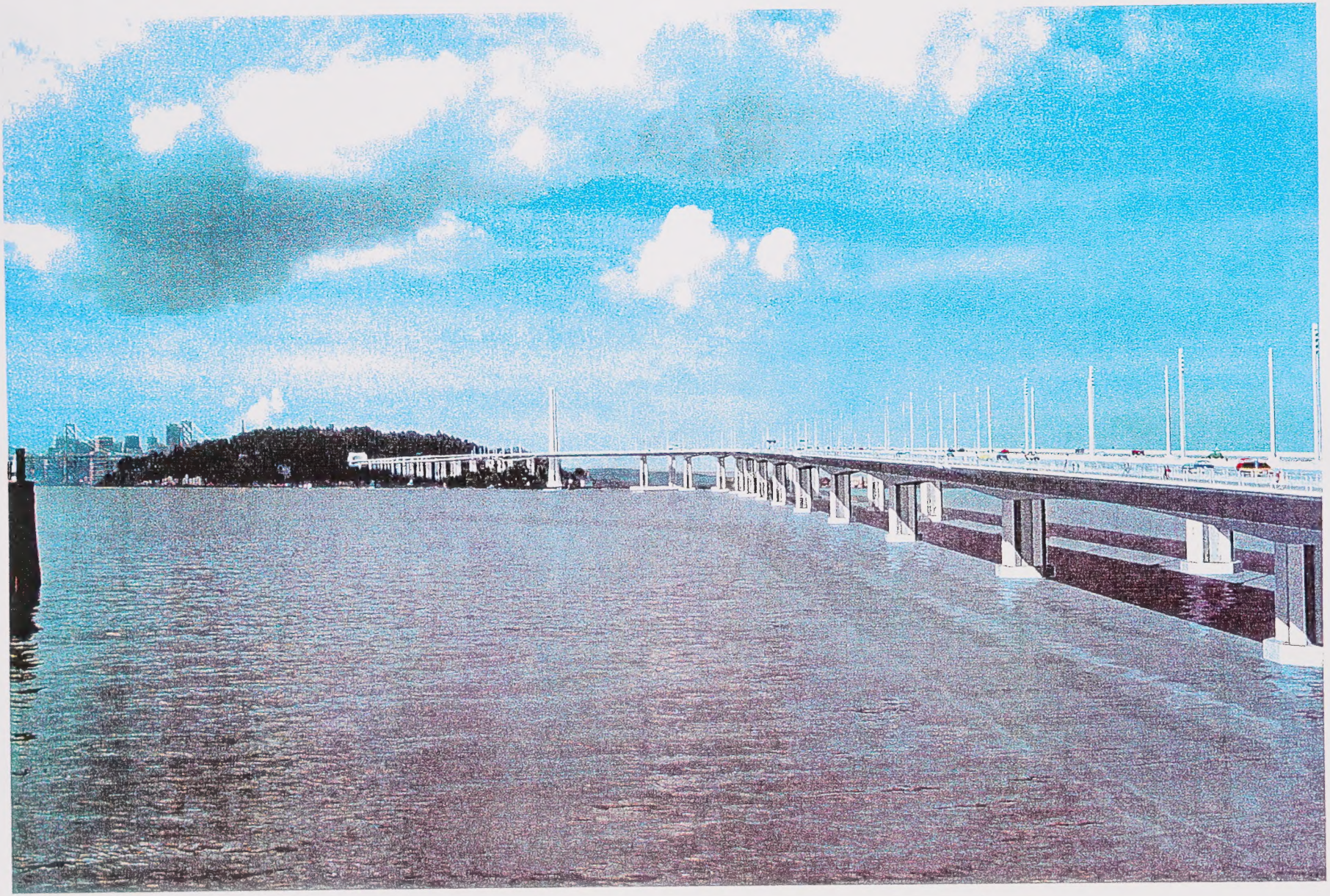
Project Layout

Figure 1-1



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Visual Simulation of the
Proposed Project

Figure 1-2

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Special Aquatic Sites at the
Oakland Touchdown Area

Not to Scale

Figure 1-3

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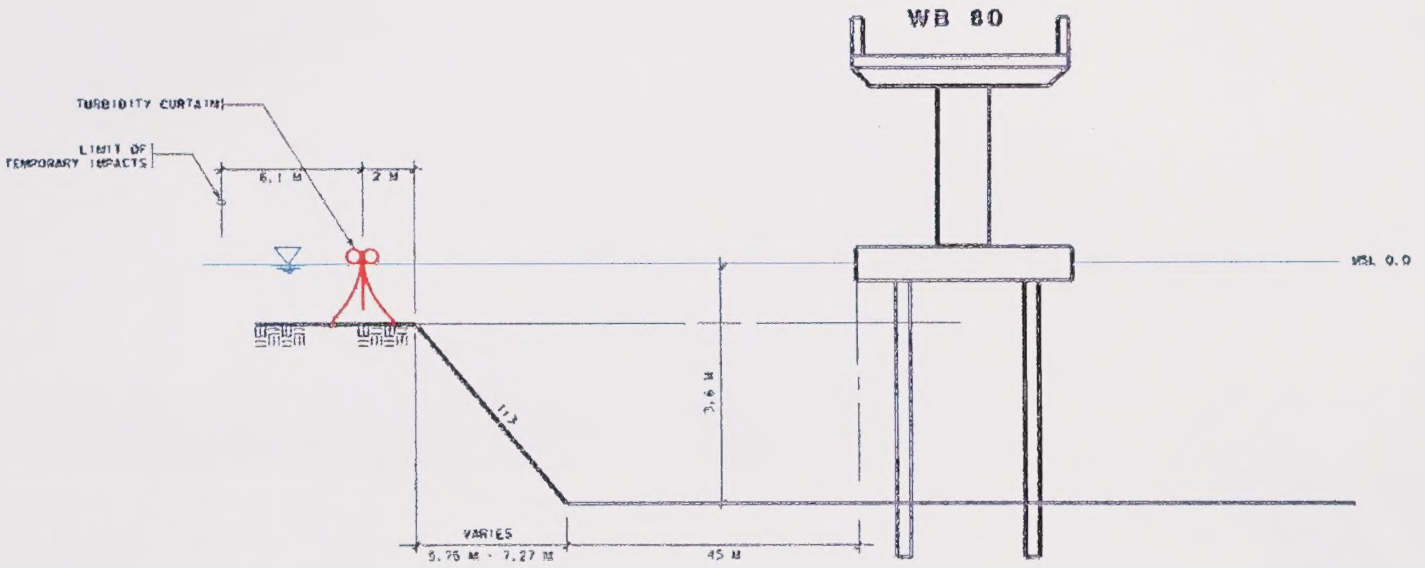
Special Aquatic Sites at Yerba Buena Island

Not to Scale

Figure 1-4



ADJUSTED PROPOSAL FULL WIDTH BOTTOM

VIEW: LOOKING EAST, NORTH SIDE OF REPLACEMENT ALTERNATIVE N-6

TYPICAL SECTION A-A - NO SCALE

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Dredging Impacts at the Oakland Touchdown Area

Not to Scale

Figure 1-5

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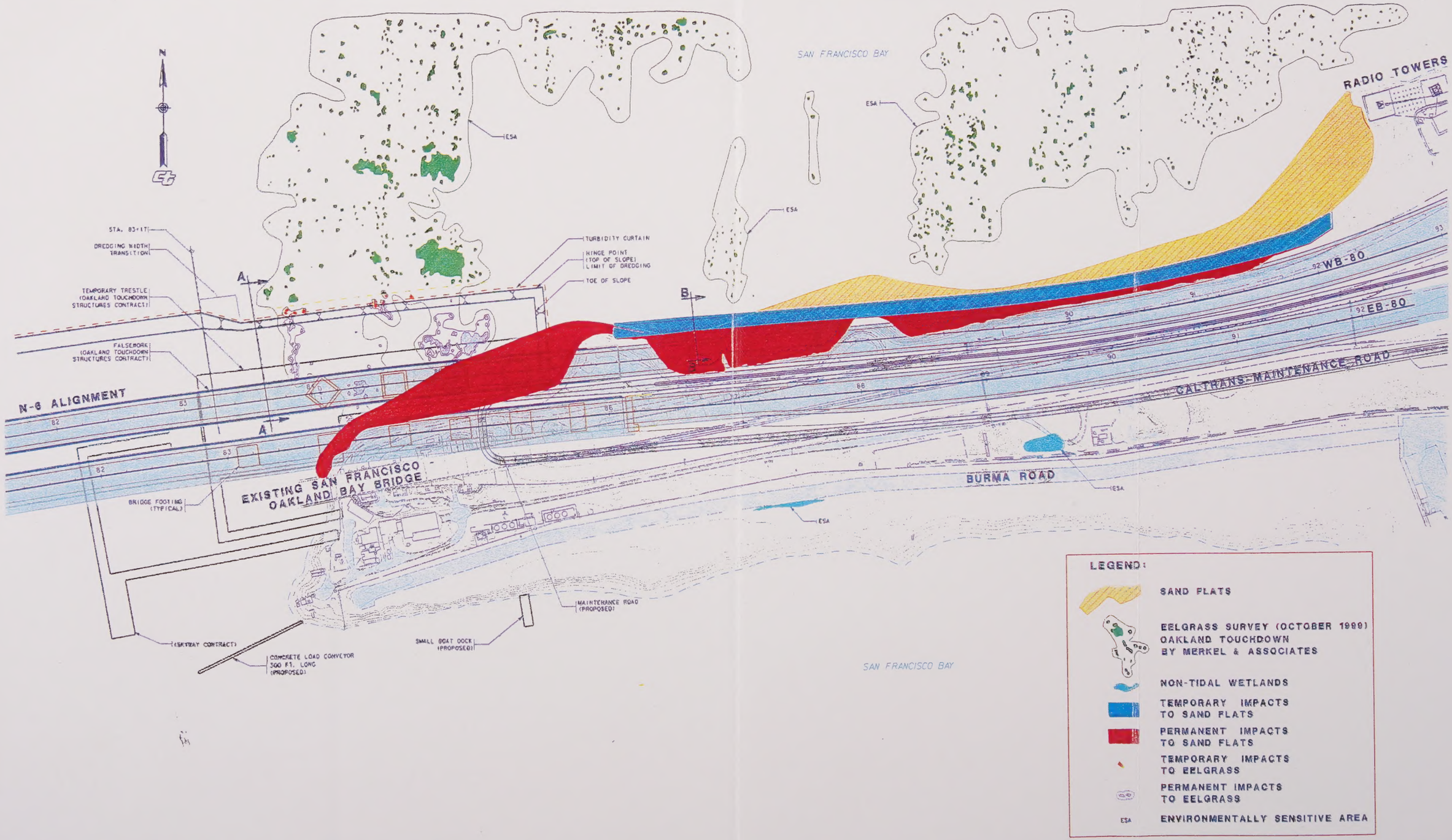
Impacts to Eelgrass at
Yerba Buena Island

Not to Scale

Figure 1-6



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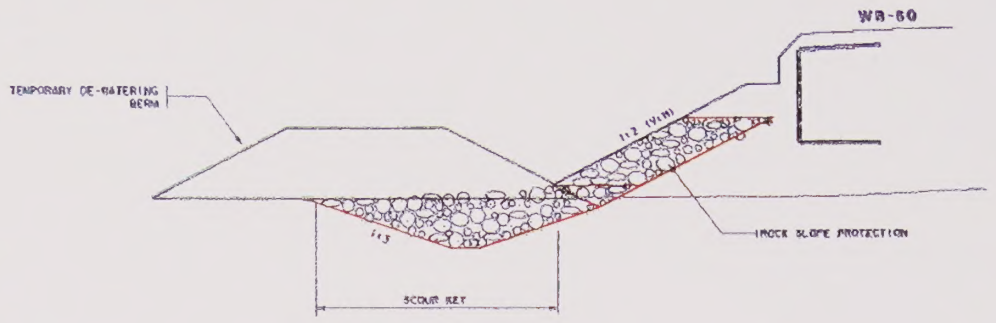
Impacts to Sand Flats and Eelgrass at the Oakland Touchdown Area

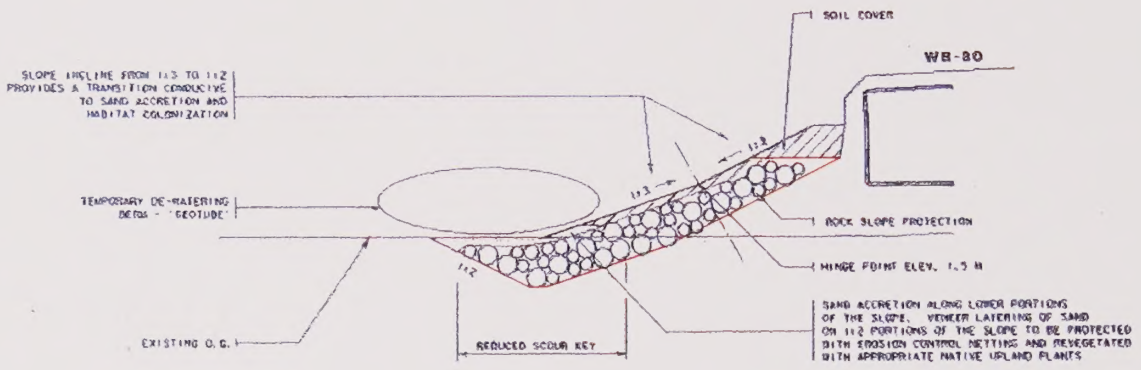
Not to Scale

Figure 1-7



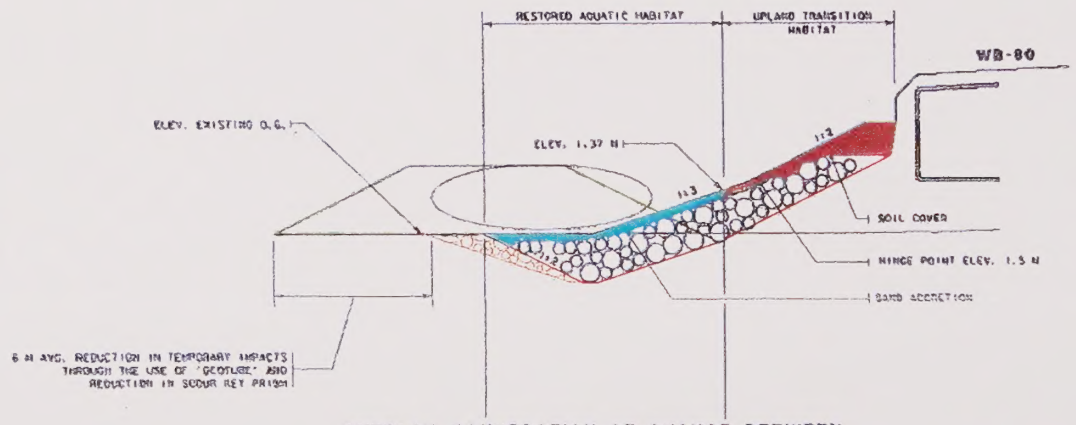
INITIAL CONCEPTUAL SLOPE TREATMENT

TYPICAL SECTION B-B - NO SCALE



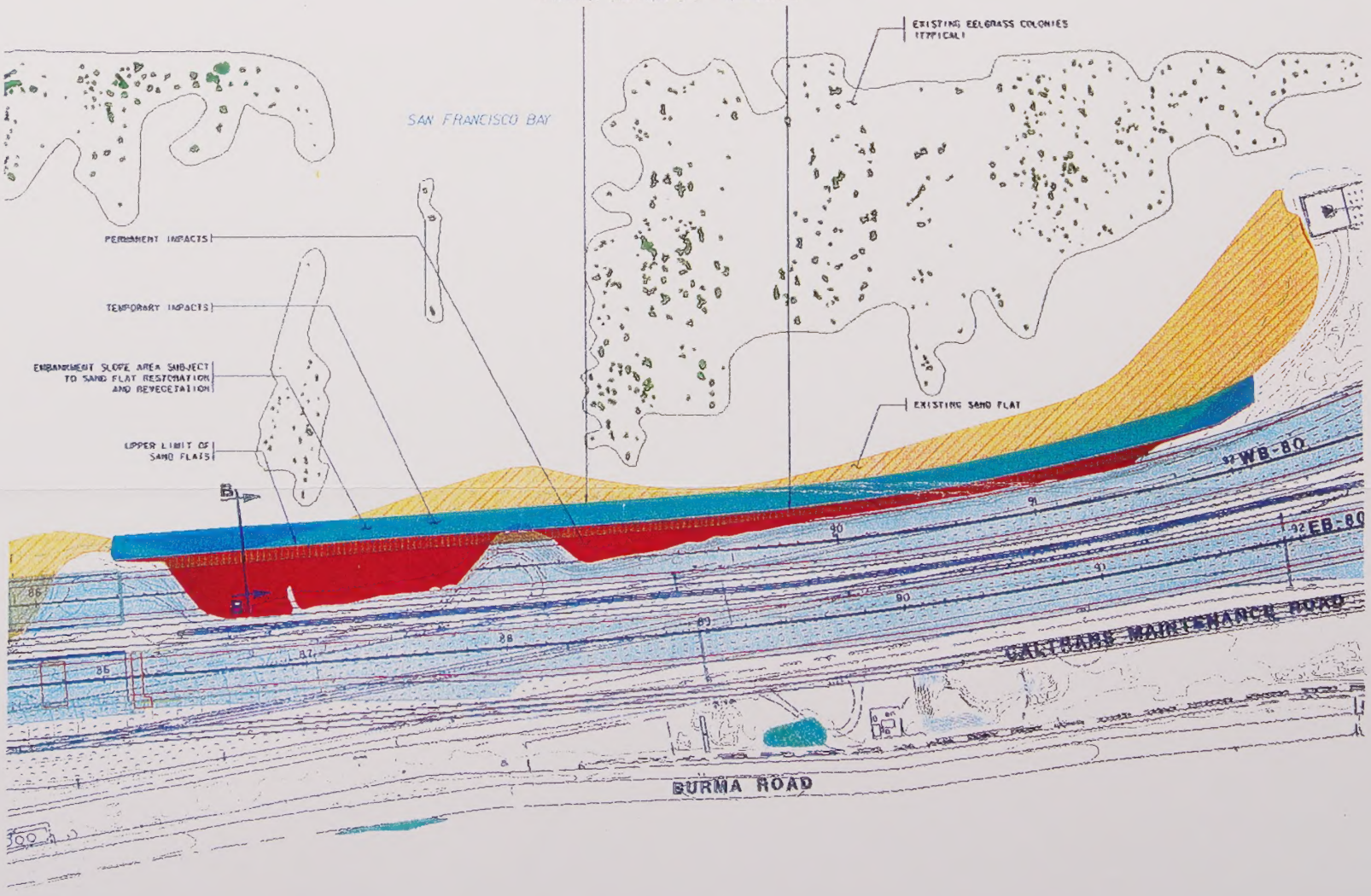
PROPOSED SLOPE TREATMENT

TYPICAL SECTION B-B - NO SCALE



OVERLAY ILLUSTRATION OF CHANGE BETWEEN INITIAL AND FINAL SLOPE TREATMENTS

TYPICAL SECTION B-B - NO SCALE



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Impacts to Sand Flats at the Oakland Touchdown Area

Not to Scale

Figure 1-8

The mitigation goal is to replace the habitat values of the affected sand flats and eelgrass beds. Caltrans proposes to achieve this goal by:

- Implementing measures to avoid and minimize impacts on-site;
- Restoring on-site special aquatic sites temporarily affected during construction; and
- Creating off-site new mudflats, tidal marsh, and tidal channels and enhancing existing wetlands and uplands.

The following sections describe the functions and values of the affected habitat and describe the habitat to be created, restored and enhanced.

2.1 FUNCTIONS AND VALUES OF AFFECTED HABITAT

2.1.1 Eelgrass

Eelgrass (*Zostera marina*) is a native marine vascular plant indigenous to the soft-bottom bays and estuaries of the Northern Hemisphere. The species is found from middle Baja California and the Sea of Cortez to northern Alaska along the west coast of North America and is common in healthy shallow bays and estuaries. The depth at which this species grows is a function of light penetration. At greater depths light is reduced to a level below which photosynthesis is unable to meet the metabolic demands of the plant to sustain net growth (the photocompensation depth).

Eelgrass beds perform multiple functions within an estuarine ecosystem. For example, they provide a nursery area for many species of fish including California halibut (*Paralichthys californicus*) and English sole (*Parophrys vetulus*). They are nursery areas for the commercially important Pacific herring (*Clupea harengus*). Detritus from eelgrass is not only used by animals immediately adjacent to the beds but also is transported further into the estuary, making it an important part of the detrital-based food web. As substrate for the epiphytic algae, invertebrates, and crustaceans on which these species feed, eelgrass beds also contribute to the ecosystem at multiple trophic levels. Eelgrass beds are also foraging areas for wintering waterfowl such as American wigeon (*Anas americana*) that feed on the roe and invertebrates.

In addition to being refugia for young fish, eelgrass beds stabilize shorelines by dampening the wave energy that transports sediment to and from the shore, preventing erosion. They also improve water quality by collecting and filtering organic matter and sediments. This filtering also acts as a nutrient pump, transferring waterborne nutrients to the sediments and invertebrates.

Eelgrass is easily affected by changes in water quality and turbidity. They are extremely dynamic, expanding and contracting by as much as several hectares per season depending on the quality of the site. Consequently, eelgrass beds serve as an indicator community for the overall health of an estuary.

The San Francisco estuarine complex is the second largest estuary in the nation and the largest estuary on the Pacific Coast. A 1987 National Marine Fisheries Service (NMFS) survey of the Bay documented 128 hectares (316 acres) of eelgrass, covering less than 0.1% of the total Bay bottom. Much of the existing eelgrass exhibits conditions of environmental stress (Wyllie-Echeverria and Rutten, 1989; Wyllie-Echeverria, 1990).

Merkel and Associates conducted surveys for Caltrans of eelgrass at the project site in October 1999. These surveys covered approximately 82 hectares (203 acres) of the project area north and south of the Oakland Touchdown area and along the eastern shoreline of YBI and Clipper Cove. Merkel and Associates found eelgrass in areas north and south of Yerba Buena Island and the area north of the Oakland Touchdown called the Emeryville Flats. The most extensive eelgrass beds were on the Emeryville Flats.

In total, the surveyed area supported approximately 16.4 hectares (40.6 acres) of eelgrass at the time of the survey, with the majority of the eelgrass beds having a vegetative coverage[1] of between 5% and 20% of the bay bottom area surveyed. This vegetative coverage varied significantly between Yerba Buena Island and the Oakland touchdown. Within the Yerba Buena Island eelgrass beds, a mean vegetative cover of 31.9% characterized the eelgrass beds. At the Oakland Touchdown area, the overall mean vegetative cover was approximately 10.6%, approximately one third the coverage, as compared to eelgrass at Yerba Buena Island. Eelgrass cover at both of these sites is similar to coverage of eelgrass beds in San Pablo Bay and eastern San Francisco Bay. However, the eelgrass beds at Yerba Buena Island had slightly greater coverage than that reported at other East Bay sites (SAIC and Merkel & Associates, 1997a and 1997b; Merkel & Associates, 1997, 1999a, 1999b).

The vegetative cover values at the Oakland Touchdown area and Yerba Buena Island compare favorably to those measured elsewhere in San Francisco Bay. Eelgrass vegetative coverage ranged from less than 5% to over 20% in a survey of Richmond Harbor and Point Richmond conducted in October 1996 (SAIC and Merkel & Associates, Inc., 1997a). In October 1998, Richmond Harbor and Point Richmond continued to support eelgrass at comparable but somewhat reduced coverages ranging from less than 5% to between 16% and 20% in subsequent surveys (Merkel and Associates, 1999a). By far, the greatest portion of these eelgrass beds fell at or below 5% vegetative cover during both 1996 and 1998. At Point Richmond in San Pablo Bay, eelgrass cover ranged between 0% and 25% with the mean cover being around 5% within Point Orient, Point Molate, and the San Pablo Shoal areas. The shallower and more sheltered portions of Point Molate supported eelgrass beds with a cover of 10% to 20% (SAIC and Merkel & Associates, 1997b). In August 1997, an eelgrass survey was completed at the Richmond-San Rafael Bridge. These eelgrass beds were found to range between 8% and 17% vegetative coverage at the east end of the bridge (Merkel & Associates, Inc., 1997b). In October 1999, the eelgrass coverage on Middle Harbor Shoal was determined to be 12% for this small bed (Merkel & Associates, 1999b).

Within the SFOBB East Span project area, the largest patches of eelgrass occurred on the high points of sandy shoals located on the Emeryville Flats. Other relatively large coalesced beds occurred within Clipper Cove on a narrow band of silt sands adjacent to the deeper navigational basin. Eelgrass is found on a range of sediment types, from fine sands to silt, and eelgrass survival and growth have not been linked to a particular sediment type (Merkel & Associates, 1998). At Yerba Buena Island, 178 eelgrass patches were recorded, while 2,493 individual eelgrass patches were recorded at the Oakland Touchdown portion of the survey area. This difference in eelgrass coverage is likely due to presence of a large amount of shallow water habitat at the Emeryville Flats, rather than specific sediment conditions.

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[1] Vegetative coverage" is the percentage of turions (eelgrass shoots) in a given area of 1/16 square meters.

The patchy, leopard-spot distribution of eelgrass observed around the SFOBB East Span is fairly typical of San Francisco Bay. This pattern is a result of environmental stresses that may vary unpredictably over time and lead to intermittent emergence or loss of eelgrass patches from an area. Typically, these dynamic eelgrass environments are strongly influenced by recruitment of new plants and mortality of older plants. Sexual reproduction may account for a portion of the plant growth within the bed. Thus, beds may be fairly diverse genetically. For such areas, the size, shape and density of eelgrass beds can be highly variable and indicative of the time between less favorable environmental conditions. The leopard-spot distribution pattern observed in the survey area is not unique to San Francisco Bay, but can be observed within marginal environments in other Bay locations as well. This pattern is typically observed at the deeper margins of eelgrass beds where light limitations preclude eelgrass growth over portions of the year or intermittently between years.

Low density of eelgrass in the project area may be the result of environmental stresses such as high turbidity. Although low density and a patchy distribution is typical of other stands in the Bay, the habitat value of the occurrences in the project area is important because of the limited distribution of eelgrass in the Bay.

2.1.2 Sand Flats

The intertidal flats north of the Oakland Touchdown have a larger grain size (> 0.6 mm) than is typical of mudflats (<0.1 mm), and are more accurately described as sand flats (Merkel 2000). The larger grain size of sand flats is due to higher wave energy. Both sand flats and mudflats are protected under the Clean Water Act, 1972 (as amended), section 404(b)(1), "Guidelines for Specification of Disposal Sites for Dredged or Fill Material", subpart E, "Potential Impacts on Special Aquatic Sites." The intertidal flats in the project area are described as sand flats to reflect their grain size.

Sand flats and mudflats are sparsely vegetated intertidal areas that occur from approximately mean lower low water (MLLW) to mean tide level (MTL). They provide protection to banks and upland shoreline from wave energy and sediment. Sand flats around San Francisco Bay provide habitat for many species of invertebrates, including diatoms, polychaetes, oligochaetes, amphipods, isopods and crustaceans. Sand flats generally have lower densities of benthic invertebrates compared to mudflats because they occur in sites with higher waver energy and more active sediment transport.

During low tide, sand flats and mudflats provide crucial foraging and roosting areas for almost one million shorebirds that utilize the Bay during the spring migration. Shorebirds present in the project area include western sandpiper (*Calidris mauri*), least sandpiper (*Calidris minutilla*), dunlin (*Calidris alpina*), long- and short-billed dowitcher (*Limnodromus griseus,* and *L. scolopaceus,* respectively), and American avocet (*Recurvirostra americana*). The longer-billed shorebirds such as long-billed curlews and whimbrels may not utilize the sand flats in the project area as frequently as nearby mudflats. This may be due to lower densities of benthic invertebrates, higher wave energy and the absence of tidal marsh along the upper margins of the sand flats (Merkel 2000). The habitat value of the sand flats in the project area is diminished by the abrupt transitions with adjacent uplands and the lack of adjacent wetland habitats. The existing shoreline adjacent to these sand flats is protected with rock riprap and the uplands are

landscaped with non-native vegetation. These characteristics reduce the potential for species to utilize the sand flats in the project area for resting, breeding and foraging.

During high tide, mudflats and sand flats provide foraging habitat for fish, including longfin smelt (*Spirinchus thaleichthys)*, staghorn sculpin (*Leptocottus armatus*), starry flounder (*Platichthys stellatus)* and leopard shark *(Triakis semifasciata).* One of the few mammals that are occasionally present on mudflats and sand flats is the Pacific harbor seal (*Phoca vitulina*).

2.2 TYPES OF HABITAT TO BE CREATED, RESTORED, AND ENHANCED

The mitigation plan includes on-site restoration of sand flats and eelgrass beds; off-site creation of mudflats, tidal channels, and tidal marsh and enhancement of existing wetlands and uplands. This section briefly describes the habitats that will be created, restored and enhanced. Section Four presents a detailed discussion of the proposed mitigation. Figure 2-1 shows the locations of the proposed sites.

Caltrans will implement on-site restoration of sand flats and eelgrass beds at the Oakland Touchdown. Existing sand flats are bordered by rock riprap at the upper margins and open water at the lower margins. These sand flats and eelgrass beds are contiguous with mudflats that extend eastward into the Emeryville Crescent. Substrates of the sand flats and eelgrass beds are relatively coarse sands.

Off-site creation of mudflats, tidal channels, and tidal marsh, and enhancement of existing wetlands and uplands will be implemented at either the Breuner property or the Liquid Gold site. These sites are characterized by upland fill, abrupt transition zones between uplands and wetlands, and non-native ruderal vegetation. Existing fill will be removed to create topography that will support tidal marsh, mudflats, tidal channels and uplands as shown on Figure 2-2.

2.3 FUNCTIONS AND VALUES OF HABITAT TO BE CREATED/ENHANCED

The habitat to be created or enhanced at the Breuner property or the Liquid Gold site will have the potential for greater diversity and utilization by animal and plant species as compared to the affected habitats at the Oakland Touchdown area and Yerba Buena Island. Mudflats, tidal channels and tidal marsh are utilized by many of the same species for resting, foraging and breeding (Table 2-1). The habitat values are greatest when mudflats, tidal channels, tidal marsh and uplands occur in one location where they can function holistically as a complete ecosystem. Habitat creation proposed at the Breuner property or the Liquid Gold site will provide this kind of synergistic value which is not present in the project area.

The following sections describe the functions and values of the mudflats, tidal channels and tidal marsh that Caltrans will create.

2.3.1 Mudflats and Tidal Channels

A general description of the functions and values of mudflats and sand flats is provided in Section 1.4.2. Caltrans will create tidal mudflats and tidal channels at either the Breuner property or the Liquid Gold site. As shown on Table 2-1, these habitats are utilized by many species that also utilize tidal marsh habitats. The proposed mitigation will provide a complex of adjoining

intertidal habitats that will be used by many of the same species that are present on the sand flats at the Oakland Touchdown area.

A natural gradient from open water to uplands that includes mudflats and tidal channels will provide enhanced functions and values relative to the fragmented and isolated sand flats in the project area. In particular, this suite of habitats or ecosystem will benefit special status species such as the California clapper rail that utilize the ecotones (transition zones) between habitats.

The mudflats created at either the Breuner property or the Liquid Gold site will be located along the outer margins of the marsh and within tidal channels. Creating new tidal marsh and tidal channels and enhancing existing wetlands will expand the suitable habitat for the California clapper rail at the Breuner property or the Liquid Gold site.

2.3.2 Tidal Marsh

Tidal marshes are one of the most productive ecosystems in the world (Mitsch and Gosselink, 1993). Tidal marshes play a role in the tidal ecosystem as both sinks and sources of nutrients. In the San Francisco Bay, for example, net primary production of native cordgrass (*Spartina foliosa*) is between 274-1400 grams per square meter per year (Josselyn, 1983). Tidal salt marshes are prolific producers of detritus, or decomposed organic matter, which plays an important role in the food chain for both the salt marsh and the estuary itself. In a study conducted in a Georgia tidal marsh, twenty-three percent of the net productivity of the tidal marsh was exported to the estuary (Teal, 1962). Tidal marshes are also used by many species of fish for shelter and foraging and as nursery areas. Striped bass (*Morone saxatilis*), chinook salmon (*Oncorhynchus tshawytscha)*, Delta smelt (*Hypomesus transpacificus)*, longfin smelt (*Spirinchus thaleichthys*) and green sturgeon (*Acipenser medirostris*) are special status species fish which utilize various tidal salt marshes in the San Francisco Bay region.

Existing tidal marshes at the Liquid Gold site and the Breuner property are dominated by species of cordgrass (*Spartina* spp.) in the lower intertidal zone and pickleweed *(Salicornia virginica*) in the middle intertidal zone. Just above the mean water line, but still within the intertidal zone, pickleweed is frequently present with saltgrass (*Distichlis spicata*), alkali heath (*Frankenia salina*), marsh jaumea (*Jaumea carnosa*) and California sea lavender (*Limonium californicum*). Tidal marsh habitat is utilized by many of the same species that utilize tidal flat habitat and the two habitats provide similar and complementary habitat functions. Table 2-1 provides a list of species and their utilization of these habitats.

Other special status species which utilize tidal salt marshes for shelter and foraging include the salt-marsh harvest mouse (*Reithrodontomys raviventris)*, California clapper rail *(Rallus longirostris obsoletus)*, salt marsh common yellowthroat *(Geothlypis trichas sinuosa)*, Alameda song sparrow (*Melospiza melodia pusillula)*, short-eared owl (*Asio flammeus)* and salt marsh wandering shrew (*Sorex vagrans halicoetes*). California clapper rail and salt marsh harvest mouse are assumed to be present on the Breuner property based on suitable habitat and observations at the adjacent Giant Marsh site. These species are not confirmed from the vicinity of the Liquid Gold site but they may be present based on the presence of suitable habitat.

Suitable habitat is present at the Breuner property and the Liquid Gold site for special status plant species such as soft bird's beak (*Cordylanthus mollis* spp. *mollis*) and johnny-nip

(*Castilleja ambigua* ssp. *ambigua*). Salt marsh gumplant (*Grindelia stricta* var. *angustifolia*), another special status species, occurs at both the Breuner property and the Liquid Gold site.

2.3.3 Uplands

Enhanced uplands at the Breuner property or the Liquid Gold site would provide refugia and foraging habitat for tidal marsh species such as the salt marsh harvest mouse. Many portions of the Bay, including the affected special aquatic sites in the project area, are bordered by uplands that are developed or dominated by ruderal and invasive non-native species. Caltrans will enhance uplands at the selected mitigation site by removing non-native plant species and replanting native upland species including grasses and shrubs such as coyote bush (*Baccharis pilularis*). The enhanced uplands will improve the habitat value of the adjacent wetlands by creating a broad gradient of intertidal and upland habitats that offer greater capacity for species utilization compared to isolated wetlands, sand flats, or mudflats.

Table 2-1

HABITAT UTILIZATION BY SPECIES

Species	Tidal Flat	Low Tidal Marsh	Mid Tidal Marsh	High Tidal Marsh	Muted Tidal Marsh	Eelgrass
MAMMALS						
Harbor seal	RB	RF				
WATERFOWL						
Mallard	F	F		RFB	RF	
Canvasback	F				RF	
Ruddy duck	F	RFB	RFB	RFB	RF	
Shorebirds						
Marbled godwit	RF	RF	RF	RF	RF	
Black turnstone	RF	R	R	R	R	
Red knot	R	RF	RF	RF	RF	
Western sandpiper	RF	RF	RF	RF	RF	
Long-billed dowitcher	RF	RF	RF	RF	RF	
OTHER BAYLAND BIRDS						
Eared grebe	F	RF		RF		
American white pelican	R				F	
Brown pelican	R	RF			R	
Double-crested cormorant	R	RF			F	
Snowy egret	F	RF	RF	RFB	RFB	
Black-crowned night heron	F	RF	RF	RF	RF	
Northern harrier	F	F	F	RFB	RF	
Peregrine falcon	RF	RF	F	RFB	F	
California clapper rail	F	RFB	RFB	RFB	RF	
California gull	RF	F			RF	
Western gull	RF	RFB		RFB	RFB	
California least tern	RF	F	F	F	RF	
Forster's tern	RF	F	F	F	RFB	
Caspian tern	RF	F			RFB	
Belted kingfisher	F	RF			RF	
Barn swallow	F	RF	RF	RFB	RFB	
FISH AND INVERTEBRATES						
White sturgeon	F	RF				F
Striped bass	F	F	F	F		
Arrow goby	RFB	RF				
Topsmelt	FB	F	F	F		
Pacific staghorn sculpin	FB	F	F	F		FR
White croaker	F		F			
Bay ray	RF	RF				
Starry flounder	RF	F				
Longjaw mudsucker	RFB	RFB	FB	FB		
Dungeness crab	RF	RF				
Mud crab	FB	FB	RF	RF		FB
California bay shrimp	RFB	RF				FR
California horn snail	RFB	RFB	RFB	RFB		
Amphipods	RFB	RFB	RFB	RFB		RFB

Note: **R**=Resting/Roosting, **F**=Foraging, **B**=Breeding;
Source: Goals Project 1999.

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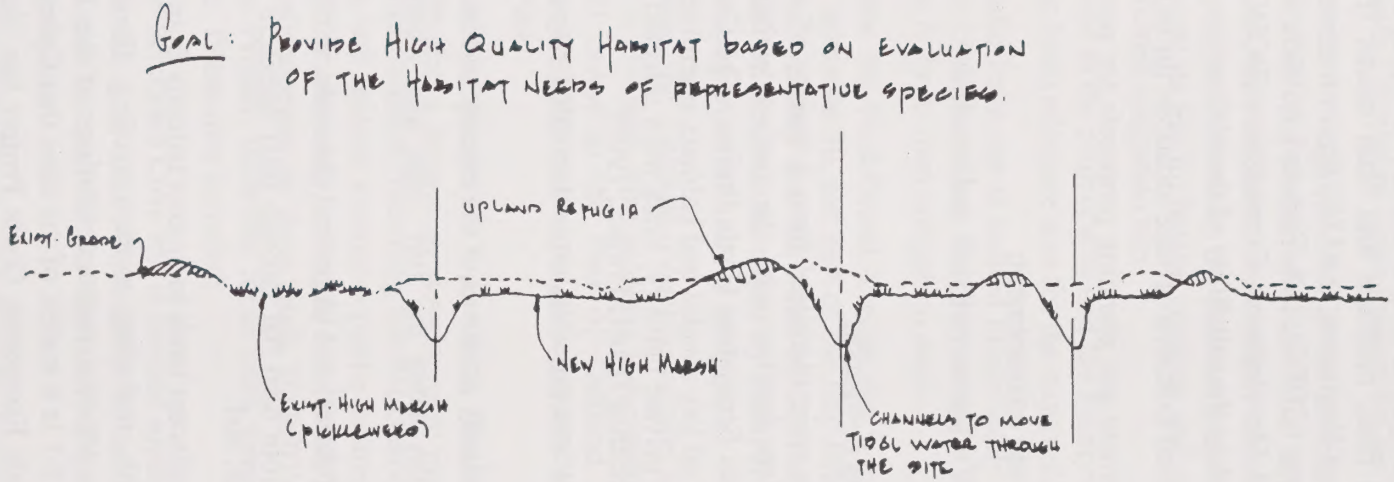
Locations of the Proposed Off-Site Mitigation Areas

Figure 2-1



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Typical Cross Section of the Proposed Off-Site Mitigation Concept

Not to Scale

Figure 2-2

3.1 SITE SELECTION RATIONALE

Caltrans evaluated fourteen potential mitigation sites to identify locations suitable for creation or enhancement of eelgrass beds, sand flats, mudflats and tidal marsh (Figure 3-1). Caltrans consulted with the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service (USFWS), the San Francisco Bay Conservation and Development Commission (BCDC) and the East Bay Regional Park District (EBRPD) regarding the suitability of these sites.

The following selection criteria were used to screen off-site locations for mitigation:

- Consistency with regional management and planning proposals for possible mitigation sites (Goals Project 1999);
- Sufficient area for habitat creation and enhancement;
- Compatibility with habitat values of adjacent wetlands and mudflats;
- Landowner cooperation; and
- Feasibility and cost of implementing mitigation.

Potential sites for tidal marsh creation were identified from a variety of sources that included local agencies, city planners, biologists familiar with the project vicinity, and the regional priority sites identified by the Baylands Ecosystem Goals Project. The Goals Project priorities were based on regional biological data on key species and habitats assembled by a consortium of public agencies, non-profit groups and private industry. Sites were selected that conformed with several ecological design principles including (Goals Project, 1999):

- Centering tidal marsh restoration, where possible, around existing populations of threatened and endangered species;
- Restoring tidal marshes along the salinity gradients of the estuary and its tributaries;
- Emphasizing tidal marsh restoration along the Bay edge and where streams enter the baylands;
- Providing natural features, such as pannes[2] and large tidal channels, within tidal marshes;
- Reestablishing natural transitions from tidal flat through tidal marsh to upland and between diked wetlands and adjacent uplands; and
- Providing undeveloped buffers on adjacent lands to protect habitats from disturbance.

Indicators of wetland ecosystem health, including nutrient cycling, flood control and water quality are expected to improve if the regional recommendations of the Baylands Ecosystem Habitat Goals are implemented. Table 3-1 is a matrix of the sites that Caltrans evaluated during the site selection process. The Baylands Ecosystem Goals Project has identified several sites throughout the San Francisco Bay that could be restored to their historical habitat (Goals Project 1999, Appendix E). Restoration of these sites will improve the health and diversity of the San

[2] Pannes are natural ponds that form in the marsh plain and fill only during very high tides.

Francisco Bay ecosystem and could also provide necessary habitat for some of the endangered species in this region. Each site is numbered with a short description of the restoration potential of the site as described in Appendix E of the Baylands Ecosystem Habitat Goals. The site numbers from the Baylands Ecosystem Goals Project list are included in Table 3-1.

Caltrans investigated potential mitigation sites in the vicinity of the project area. Most were not considered feasible for the reasons discussed below. The Breuner property and the Liquid Gold site were the only options with sufficient area within central San Francisco Bay that meet the mitigation needs of the project. Moreover, the Breuner property is the only site with a landowner that currently intends to use its site for habitat creation and enhancement. Therefore, the Breuner property is Caltrans preferred mitigation site.

Sites immediately adjacent to the project area and the Emeryville Crescent were rejected because the land is unavailable or lacks adequate size for the required mitigation. These sites include:

- **Radio Point**: the Radio Point site is located immediately north of the Bay Bridge Toll Plaza, less than 160 meters (525 feet) from the project area. The Port of Oakland currently owns the land and may use it for its own mitigation needs.
- **West Grand Avenue**: the West Grand Avenue site is located north of the new West Grand Avenue overpass at Interstate 80, just east of the Bay Bridge Toll Plaza. This site is partially owned by the Port of Oakland and the State of California. The portion of this site that is owned by the State of California is managed by EBRPD as part of the Eastshore State Park. Caltrans previously used part of the site for mitigation.
- **Oakland Touchdown**: the Oakland Touchdown site is located where the existing Bay Bridge touches land in Oakland. This property is located on Caltrans right-of-way within the project area. It will revert to the Port of Oakland if Caltrans declares it excess to transportation needs. EBRPD has expressed interest in this land becoming part of the proposed Gateway Park.

Several potential sites north of the project area within Eastshore State Park are managed by the EBRPD. EBRPD will develop a long-range development plan for the Park to identify potential recreational uses and improvements, including habitat creation and enhancement. However, the planning process, which will include extensive public participation, will not be completed until 2001 at the earliest. Until the planning process is completed, EBRPD cannot make commitments for habitat creation or enhancement on these lands. EBRPD's timeline is not in accord with the plans for the East Span Project; therefore these sites were eliminated from consideration as potential mitigation sites. These sites included:

- **Brickyard Cove**: the Brickyard Cove site is located south of University Avenue, and west of the frontage road on the west side of Interstate 80 in the City of Berkeley. The EBRPD manages Brickyard cove as part of the Eastshore State Park complex, but the State of California owns the property.
- **Berkeley Meadows/Virginia Street**: the Virginia Street site is located north of University Avenue and west of the frontage road on the west side of Interstate 80 in the City of Berkeley. The EBRPD manages the Virginia Street site as part of the Eastshore State Park complex, but the State of California owns the property.

Potential mitigation sites at and near the City of Albany's former landfill were identified. However, these sites are too small to meet Caltrans' mitigation needs. Moreover, the City of Albany has received funds from the State of California to restore Albany Bulb and Albany Beach. This precludes the use of these sites by Caltrans for mitigation purposes.

- **Buchanan Marsh**: the Buchanan Marsh site is located in the City of Albany south of Buchanan Street and west of Interstate 80. Magna Entertainment, owner of the adjacent Golden Gate Fields Race Track, owns this property.
- **Albany Bulb and Beach**: the Albany Bulb and Beach are located northwest of Golden Gate Fields racetrack, west of Interstate 80, near the terminus of Buchanan Street. The City of Albany owns these parcels and plans to restore them.

3.2 RATIONALE FOR OUT-OF-KIND MITIGATION FOR SAND FLATS

Sand flats permanently impacted during construction will be mitigated by the off-site creation of a tidal marsh ecosystem including tidal channels and mudflats. Caltrans evaluated options for in-kind replacement of permanently impacted sand flats at or near the project site. Although it is desirable to mitigate sand flat impacts with in-kind replacement, Caltrans has concluded that this option is not feasible on the scale required for the proposed project. This conclusion was based on the difficulty in finding sufficient and suitable land at or near the project site for creation of this type of habitat. However, Caltrans does propose on-site restoration of sand flats.

Creation of sand flat habitat is constrained by several factors. First, sand flats are a transitional intertidal habitat. Water permanently borders the lower edge of the sand flat while the upper end of the sand flat transitions to tidal marsh or directly to uplands. There are two options for creation of new sand flats: 1) extend the sand flat at the lower edge; or 2) extend the sand flat at the upper edge. Extending the sand flat at the lower edge is feasible, but not desirable, because it requires filling open water to create appropriate intertidal elevations. Extending the sand flat at the upper margin is desirable only if the sand flat is bordered directly by uplands. Otherwise it is necessary to excavate wetlands or other jurisdictional habitat.

If the sand flat is bordered directly by uplands, the sand flat can be extended on the landward side by excavating the uplands. The uplands need to be excavated to a sufficient depth to prevent colonization by tidal marsh species. But the upper end of the existing sand flat is generally just slightly lower than the lower limit of tidal marsh species. This leaves very little freeboard with which to construct the new sand flats. It is likely that the created sand flats would quickly fill with sediment and become colonized by tidal marsh species. One possible solution, creating long strips of narrow sand flats, is not feasible because there are no sites in the project vicinity with sufficient shoreline available.

3.3 RATIONALE FOR OUT-OF-KIND MITIGATION FOR EELGRASS

Creation of eelgrass habitat is still experimental in the Bay, and the success rate for such projects varies depending on what method is used (Merkel & Associates, 1998). The Richmond Harbor Training Jetty Eelgrass Transplant Program, which was completed in 1985, was among the first transplant programs in the Bay Area. Eelgrass was transplanted to an unmanipulated site. The survival of the plants was mixed, depending on the location and age of the donor material. The eelgrass in the control and transplant areas did not expand their range in the spring and summer

of the transplant year. Based on the experience of this project, Merkel concluded that in the Bay sites specifically manipulated for eelgrass transplantation may be more successful (Fredette et al, 1988; Merkel & Associates, 1998). The habitat in the San Francisco Bay is sufficiently different that available data from southern California is not readily transferable to this area.

Despite these challenges, Caltrans proposes on-site eelgrass mitigation. The proposed approach will maximize the potential for planting success by incorporating site manipulation, monitoring and data collection. These measures are described in Section Four. However, due to the experimental nature of eelgrass mitigation, Caltrans will also implement off-site mitigation in the form of a tidal marsh ecosystem (out-of-kind mitigation). Tidal marsh creation and enhancement have historically been more successful than eelgrass transplantation and are identified by the Goals Project as a priority for the eastern portion of the central Bay.

Table 3-1

SUMMARY OF HABITAT MITIGATION SITES EVALUATED BY CALTRANS

Goals Project Site No.	Site	County	Total Estimated Area (Acres)	Owners	Site Conditions	Mitigation Potential/ Area (Acres)				Opportunities/Constraints
						Upland Enhancement	Mudflat/ Channel Creation	Tidal Marsh Creation	Eelgrass Planting	
57	Breuner Property	Contra Costa	90-100	Bay Area Wetlands, L.L.C.	Upland fill, tidal marsh, seasonal wetlands	0.9	1.8	8.5		Remove upland fill to create tidal marsh, tidal channels, and transition zone habitats. Approximately 48 acres of the land were available, but 12 acres are now under contract.
86	Liquid Gold/ Hoffman Marsh	Contra Costa	47	Southern Pacific and EBRPD	Undeveloped fill, tidal marsh, seasonal wetland	12.8	1.0	15.2		Remove upland fill to create tidal marsh. Restore native upland vegetation. Approximately 18 upland acres of the site was a former superfund site, but has since been remediated.
N/A	Oakland Touchdown	Alameda	1.5-2	Caltrans	Upland fill, landscaped uplands	0.3	0.1	0.5	X (adjacent areas)	This property will revert to the Port of Oakland if Caltrans declares it excess to transportation needs. Upland fill would be removed to create tidal marsh, channels, and transitional habitats.
80	Radio Point	Alameda	6.9	Port of Oakland	Developed and landscaped upland fill, sandy beach, sand dunes	0.8 (uplands) 0.5 (dunes)	0.6	1.3	X (adjacent areas)	The Port of Oakland may use this site for its own mitigation needs. Mitigation opportunities include enhancement of the existing marsh by removing the buildings and parking lot presently on site, restoration of the tidal marsh and sandy beaches as well as *Spartina alterniflora* eradication. The feasibility of eelgrass transplantation needs to be assessed.
80	West Grand Avenue Overpass	Alameda	0.5	Caltrans/ East Bay Regional Park District (EBRPD)	Upland fill, rock-reinforced shoreline	0.9		1.0		This parcel borders tidal marsh. Upland fill can be removed for restoration and non-native upland vegetation removed and planted with native upland species.
81	Brickyard Cove	Alameda	Unknown	State of California; managed by EBRPD	Upland habitat on artificial fill, small tidal marsh, rubble rip-rap shoreline	6.0	1.0	2.2		Non-native species from upland and wetland habitats can be removed. Remove upland fill to create transition zone habitats, tidal mash, and mudflats. The EBRPD must finalize its planning process before mitigation plan can be finalized.
82	Berkeley Meadows/ Virginia Street	Alameda	20-30	State of California; managed by EBRPD	Upland habitat on artificial fill, seasonal wetlands, rubble rip-rap shoreline	6.0	3.6	8.6		Remove rock slope protection and upland fill to create a transition zone between tidal and upland habitats. Restore lower reach of Schoolhouse Creek at confluence with Bay. The EBRPD must finalize their planning process before mitigation plan can be finalized.

Table 3-1

SUMMARY OF HABITAT MITIGATION SITES EVALUATED BY CALTRANS

Goals Project Site No.	Site	County	Total Estimated Area (Acres)	Owners	Site Conditions	Mitigation Potential/ Area (Acres)				Opportunities/Constraints
						Upland Enhancement	Mudflat/ Channel Creation	Tidal Marsh Creation	Eelgrass Planting	
83	Buchanan Marsh	Alameda	4.15	Magna Entertainment	Tidal marsh with adjacent upland fill	1.85		2.3		Replace culverts and remove fill and debris. Restore upland-wetland transition zone and remove non-native species. There is potential to expand the marsh into the Golden Gate Field corporation yard.
84	Albany Beach	Alameda	3.36	City of Albany	Beach dunes	1.46 (dune) 1.1 (upland)		0.8 (brackish marsh)		Existing dune and brackish marsh habitats. Dominated by non-native species with narrow transition zone. Remove non-native species and replace with natives. Owned by City of Albany.
84	Albany Bulb	Alameda	31	City of Albany	Isolated lagoon surrounded by breakwater		6.1 (outer) 1.4 (inner)		X	Remove section of breakwater to restore tidal flow and create tidal marsh and mudflat. The City of Albany will receive $637,000 in state funds to breach the levees and restore some tidal marsh and aquatic habitat.
51	Hamilton Air Force Base	Marin	900	State Lands Commission	Diked marsh			26 (3% of total)		Approximately 93,000 m^3 (122,000 cy) of dredged material from the project area may be provided for tidal marsh restoration. The Hamilton AFB site will require approximately 4.2 million cubic yards of dredged material. This project would provide 3 percent of that total.
N/A	Robert's Landing	Alameda	50	State Lands Commission, City of San Leandro	Tidal marsh, mudflat	2.1 (uplands) 1.8 (dunes)				Stable dune system could be enhanced and re-established with native vegetation. *Spartina alterniflora* is present and could be removed, enhancing the existing mudflat.
N/A	Treasure Island	San Francisco	40	U.S. Navy	Developed fill			9		Thirty-one out of 40 acres are planned for a wastewater treatment marsh. The San Francisco Board of Supervisors has approved wetlands in the overall plan. EIR/EIS for the Island is currently being written.
N/A	Martinez Regional Shoreline Park	Contra Costa	unknown	EBRPD	Tidal marsh			X		Caltrans, EBRPD, and the City of Martinez will enhance the quality of the marsh, provide flood hazard reduction and provide Delta smelt habitat in the shallow water tidal area as mitigation for the Carquinez Bridge Project. Units 6,7 and 8 can still be restored to tidal marsh.

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Locations of Potential Mitigation Sites Evaluated by Caltrans

Figure 3-1

4.1 SUMMARY OF PROPOSED MITIGATION

The proposed mitigation emphasizes avoidance and minimization of impacts in the project area. Potential impacts to wetlands, sand flats and eelgrass will be avoided by designating special aquatic sites as ESAs on the plans and specifications and physically delineating them on-site in the construction zone. Additional impacts to eelgrass and sand flats will be minimized by on-site restoration following completion of construction. Eelgrass test plots will be created on-site and monitored to determine the best methods for eelgrass transplantation in the portion of the barge access channel that currently supports eelgrass. Portions of this channel may be restored to the original depths using coarser grained sediment on the top, and replanted with eelgrass. In addition, the sand flats affected during construction of the new bridge approach will be restored to their original profile and substrate.

In addition to the on-site avoidance and minimization measures, Caltrans will implement off-site mitigation. This involves creation of a fully functional tidal marsh ecosystem including new mudflats, tidal channels and tidal marsh, and enhanced wetlands and uplands. Caltrans will provide approximately 4.73 hectares (11.70 acres) of off-site mitigation to compensate for permanent and temporary impacts to eelgrass and sand flats. This will result in a mitigation ratio of approximately three to one. Caltrans will provide an additional 0.38 hectares (0.94 acres) of tidal marsh habitat to address Bay fill impacts associated with the San Francisco Bay Conservation and Development Commission's (BCDC) regulatory requirements. This is reflected in the totals shown on Figure 4-2.

The three to one ratio is a valid replacement ratio given that the replacement mitigation will be of a higher value than what is currently found at the Oakland Touchdown area. The existing habitats are not bordered by complementary habitats that provide important transitional zones and structural diversity for wildlife. The off-site habitat creation and restoration proposed by Caltrans will create a natural gradient between open water, mudflats, tidal marsh and upland habitats typical of high value shoreline habitat.

4.2 AVOIDANCE AND MINIMIZATION

4.2.1 Sand Flats

To minimize impacts to sand flats at the Oakland Touchdown area, Caltrans will place geotextile fabric and plywood onto the sand flats before placing a geotube for temporary dewatering, installation of wick drains and placement of engineered fill for the westbound roadway A "geotube" is a large, high density polyethylene tube filled with excavated material used as a temporary tidal barrier during construction.

4.2.2 Eelgrass

Construction in the vicinity of eelgrass beds will be tightly controlled to minimize temporary impacts caused by increased turbidity. Controls will include turbidity curtains, limitations on barge and tug maneuvering and post-construction monitoring to evaluate effects of turbidity on eelgrass. Construction controls and ESAs will be added to project plans, specifications, and estimates to further minimize construction period impacts. Caltrans will mark the ESA in the

field during construction with buoys or similar devices to keep construction activities outside the beds. This ESA will apply to those beds located outside the direct construction zone.

4.2.3 Wetlands

Construction controls and ESAs will be shown on project plans, specifications, and estimates to avoid construction period impacts. Caltrans will place exclusion fencing around all non-tidal wetlands in the project during construction to keep construction activities outside of the wetlands. Caltrans will also delineate tidal wetlands in the field with buoys or similar devices to prevent construction period impacts.

4.3 EELGRASS MITIGATION

No sites in the Bay have been manipulated for eelgrass transplantation and accordingly there is no available data from the Bay about the factors in success or failure of eelgrass transplantation. Therefore, Caltrans proposes eelgrass mitigation to include:

- Harvesting eelgrass from the barge access channel prior to construction and planting it in test plots adjacent to the project area north of the Oakland Touchdown. Caltrans will design these plots to identify a successful methodology for transplanting eelgrass in the restored barge access channel. In addition, the test plots will generate additional data for eelgrass transplantation in the Bay since this information is limited.
- Restoring a portion of the barge access channel that was vegetated with eelgrass to facilitate colonization of eelgrass or possibly transplanting the access channel with eelgrass from an adjacent area. Eelgrass is prolific and grows easily where suitable habitat exists. The probability that eelgrass will recolonize an area where it once grew is high if the conditions are suitable (Merkel 2000). Replanting the site before natural colonization occurs may expedite the process.

Caltrans will harvest eelgrass from within the barge access channel prior to dredging it and transplant it in adjacent areas outside the construction zone. These eelgrass test plots will be established north of the Oakland Touchdown area to determine appropriate planting strategies to restore the barge access channel. Only one transplantation of eelgrass has occurred in the Bay, at the Richmond Harbor Training Jetty in 1985. The site was not manipulated and the results were unsuccessful. Unmanipulated sites have a 38.2% success rate (Merkel & Associates, Inc., 1998). The eelgrass coverage at the unmanipulated sites may depend more upon whether the dynamic beds are contracting or expanding at the time of the transplants than upon transplanting itself (Merkel 2000; Merkel & Associates, Inc., 1998). "Such transplants performed while a native bed is contracted in its distribution may be successful, but in fact, the transplant does little for the overall status of the resource since a natural expansion phase in the native bed would render the same results (Merkel & Associates, 1998)."

Because of the dynamic nature of eelgrass beds, test plots will provide additional data on methodologies to create and enhance existing eelgrass beds in the Bay. The plots will contain at least one control plot adjacent to but not affected by the project, in addition to plots that have been manipulated to increase eelgrass success. Manipulations in the test plots may include experimenting with the type of planting unit employed (i.e. bare root or sediment plug), planting depth, substrate grain size, and the microtopography of the surface sediment, among others.

Caltrans will monitor for temporary impacts of turbidity due to dredging, pile driving, prop wash and mud boils. If additional eelgrass beds have been affected during construction, Caltrans will consult with the permitting agencies to determine if additional mitigation is warranted. Caltrans will restore up to approximately 0.70 hectares (1.73 acres) of the barge access channel to its original bathymetry where eelgrass currently exists. The restoration will occur following construction. Dredge material from the project site suitable for in-Bay disposal will be stockpiled and used to fill and restore the barge access channel to suitable depths for eelgrass colonization. A cap of sand, obtained from the affected sand flats, will be placed on top of the dredged material to provide an appropriate substrate for eelgrass. The restored channel outside the area shadowed by the westbound bridge structure may be replanted with eelgrass. Replanting depends upon the availability of an adequate donor site and the demonstrated success of the transplanted eelgrass described above.

Caltrans has not yet determined the costs for eelgrass test plots and restoration of portions of the barge access channel. In addition to on-site mitigation measures, Caltrans will provide out-of-kind mitigation to offset the remainder of the eelgrass impacts by creating a new tidal marsh ecosystem as described in Section 4.4.1.

4.4 SAND FLAT MITIGATION

Sand flats are difficult to create in areas where they have not been historically present. This is because sand flats are a complex balance of sediment deposition and erosion that is influenced by the physical, chemical and biological properties of the sediment as well as by wave energy and currents. For sand flats to sustain this balance, it is vital that the wave energy is strong and frequent enough to prevent the establishment of tidal marsh vegetation such as cordgrass. Otherwise, sedimentation will occur and vegetation will convert a newly created sand flat into a tidal marsh.

Due to the low potential for success in artificially establishing this balance, Caltrans will provide out-of-kind mitigation for sand flat impacts, by creating new mudflats, tidal channels and tidal marsh. As part of the tidal marsh ecosystem, approximately 1.54 hectares (3.80 acres) of mudflat habitat will be created along the margins of tidal channels and at the outer margins of restored tidal marsh. Tidal channels are utilized as foraging and roosting areas during low tide by many of the same shorebird and seabird species typical of sand flats and mudflats. Additionally, tidal channels are used by California clapper rails during low tide for transit, roosting and foraging. Mudflat creation will require grading upland to the intertidal zone and depositing fine sediment on the surface. Two alternate sites are proposed for mudflat, tidal channel and tidal marsh creation, and enhancement of existing upland habitats and wetlands.

4.4.1 Creation of Tidal Marsh Ecosystem

The Breuner property is Caltrans preferred location for creation of a tidal marsh ecosystem. This preference is based on the availability of the land for mitigation and the site selection criteria outlined in Section Three. The Breuner property and the Liquid Gold site are described below. If the Breuner property were unavailable, tidal marsh, tidal channel and mudflat creation and enhancement would be implemented at the Liquid Gold site.

Breuner Property

The Breuner property is located approximately 18 kilometers (11 miles) north of the project area in Richmond, California, west of Interstate 80 and north of the Richmond Parkway (Figure 4-1). The Baylands Ecosystem Habitat Goals Project (1999) recommended the creation of tidal marsh at this property as a conservation goal in the Contra Costa West segment of the plan.

The property is controlled by Bay Area Wetlands, L.L.C. (BAW), a privately owned company founded in 1999 to acquire, develop and manage properties for their ecological and development potential. Bay Area Wetlands operates the property as a third party mitigation bank. It is not a formal mitigation bank and BAW does not have mitigation credits available for purchase. Instead, habitat restoration is implemented on an as-needed basis. Mitigation needs are assessed annually and implemented each fall.

The Breuner property has approximately 19.4 hectares (48 acres) of upland on bay fill, intermixed with seasonal and tidal wetlands. Caltrans will create 4.73 hectares (11.70 acres of tidal marsh. The property is contiguous with Giant Marsh, a tidal marsh located in EBRPD's Point Pinole Regional Park (Figure 4-2). Because the new tidal marsh will be contiguous with Giant Marsh, it will provide a greater benefit for tidal marsh species than if the same area of habitat was created in isolation. Giant Marsh will be used as a template for the development of the Breuner marsh and will provide a seed source. Examples of the marsh topography, channel dimensions, species composition and cover can be directly applied to the restoration plan on the Breuner property.

Presently, the upland portions of the Breuner property are dominated by ruderal herbaceous vegetation growing on fill. Typical species are non-native and include yellow fennel (*Foeniculum vulgare*), yellow star thistle (*Centaurea solstitialis*), prickly lettuce (*Lactuca seriola*) and wild oats (*Avena barbata*). Seasonal wetlands and some muted[3] tidal wetlands are present on the property.

Vegetation within the muted tidal marsh includes pickleweed (*Salicornia virginica*), alkali heath (*Frankenia salina*), jaumea (*Jaumea carnosa*), California sea-lavender (*Limonium californicum*), saltgrass (*Distichlis spicata*) and California cordgrass (*Spartina foliosa*).

Mitigation options at the site include:

- Removing upland fill to create a tidal marsh ecosystem including mudflats, tidal channels, tidal marsh, and wetland-upland transitional habitats, and enhance existing upland habitats and wetlands (Figure 2-2). Approximately 4.73 hectares (11.70 acres) of tidal marsh could be created at this site. This total includes 0.73 hectare (1.8 acres) of mudflats, 0.81 hectare (2.0 acres) of tidal channels, 3.21 hectares (7.94 acres) of tidal marsh and 0.36 hectares (0.90 acres) of enhanced uplands; and
- Enhancing hydrology and vegetation composition of existing seasonal wetlands and muted tidal marsh.

[3] Muted tidal marshes receive less than full tidal flow because of a physical impediment. At the Breuner property full tidal flow is excluded from portions of the site adjacent to the railroad embankment by intervening fill.

The estimated cost of mitigation at the Breuner property is approximately two million dollars for 4.73 hectares (11.70 acres). This estimate includes acquisition of the mitigation rights, fill removal, grading, planting and monitoring.

Liquid Gold

The Liquid Gold site consists of approximately 7.3 hectares (18 acres) of a 12.0 hectare (29 acre) property owned by Southern Pacific Transportation Company (SPTCo) in south Richmond, Contra Costa County (Figure 4-3). The Liquid Gold site is located approximately 10 kilometers (6 miles) north of the project area. Hoffman Marsh borders the site to the east and southeast; tidal channels connect to San Francisco Bay border the site to the west and southwest. As with the Breuner property, the healthy tidal marsh adjacent to the Liquid Gold site can act as a template for the new marsh and serve as a seed source.

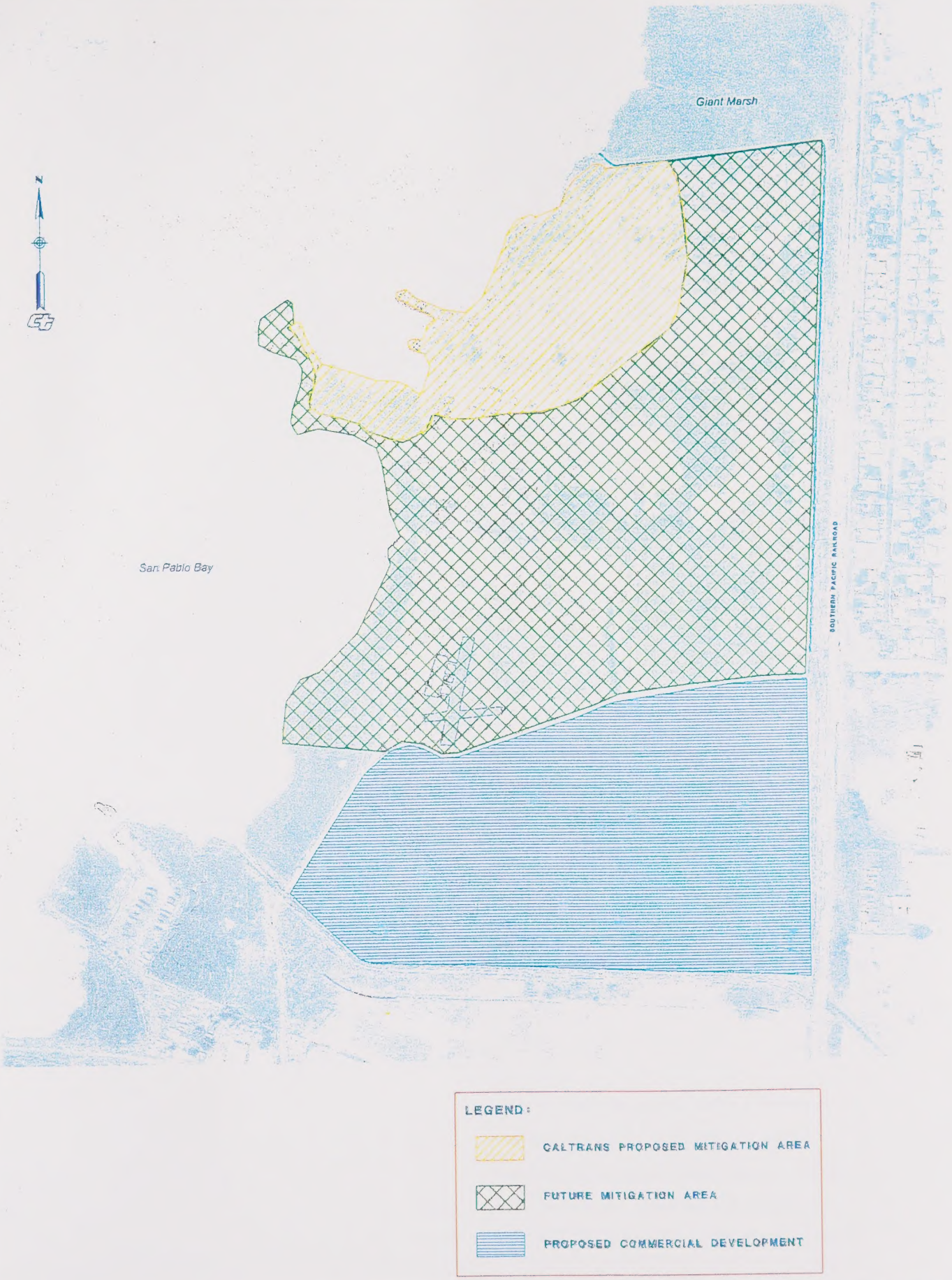
Originally, a major portion of the property was marshlands that were filled in the 1940s and 1950s. SPTCo leased approximately 1.2 hectares (3 acres) of the site to an asphalt manufacturing plant and later to a waste oil storage and transfer facility that operated under the name of Liquid Gold Oil Corporation. From 1965 to 1980, Liquid Gold Oil Corporation operated a used oil and solvent collection, storage and transfer facility on the site. In 1983, Liquid Gold Oil ceased operations. Over the next several years, 27 storage tanks were removed, buildings were demolished and contaminated soil was removed for off-site disposal.

The final clean-up actions for the entire site included capping the remaining contamination and excavating portions of the adjacent wetlands. Clean-up activities were completed in 1995. SPTCo continues to monitor the cap and the groundwater. The site was deleted from the National Priorities List (NPL) list in September 1996. The NPL constitutes Appendix B of 40 CFR part 300 which is the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), which EPA promulgated pursuant to Section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) (EPA, Federal Register #47825).

The upland fill is dominated by coyote bush (*Baccharis pilularis*), gumplant (*Grindelia camporum*), and ruderal upland species including yellow fennel (*Foeniculum vulgare*) and wild oats (*Avena barbata)*. Steep slopes around the margins of the fill create an abrupt transition zone with the adjacent tidal marsh habitat that is dominated by pickleweed (*Salicornia virginica*).

Mitigation options at this site include removing upland fill to create a tidal marsh ecosystem including mudflats, tidal channels, tidal marsh, and wetland-upland transitional habitats, and enhance existing upland habitats and wetlands (Figure 2-2). Approximately 4.73 hectares (11.70 acres) of tidal marsh could be created at this site. This total includes 0.73 hectare (1.8 acres) of mudflats, 0.81 hectare (2.0 acres) of tidal channels, and 3.21 hectares (7.94 acres) of tidal marsh and 0.36 hectares (0.90 acres) of enhanced uplands; and

Estimated costs to implement this mitigation at the Liquid Gold site are three to five million dollars for acquisition and approximately one million dollars for fill removal, grading, planting and monitoring.



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Breuner Property Land Use Plan

Not to Scale

Figure 4-1

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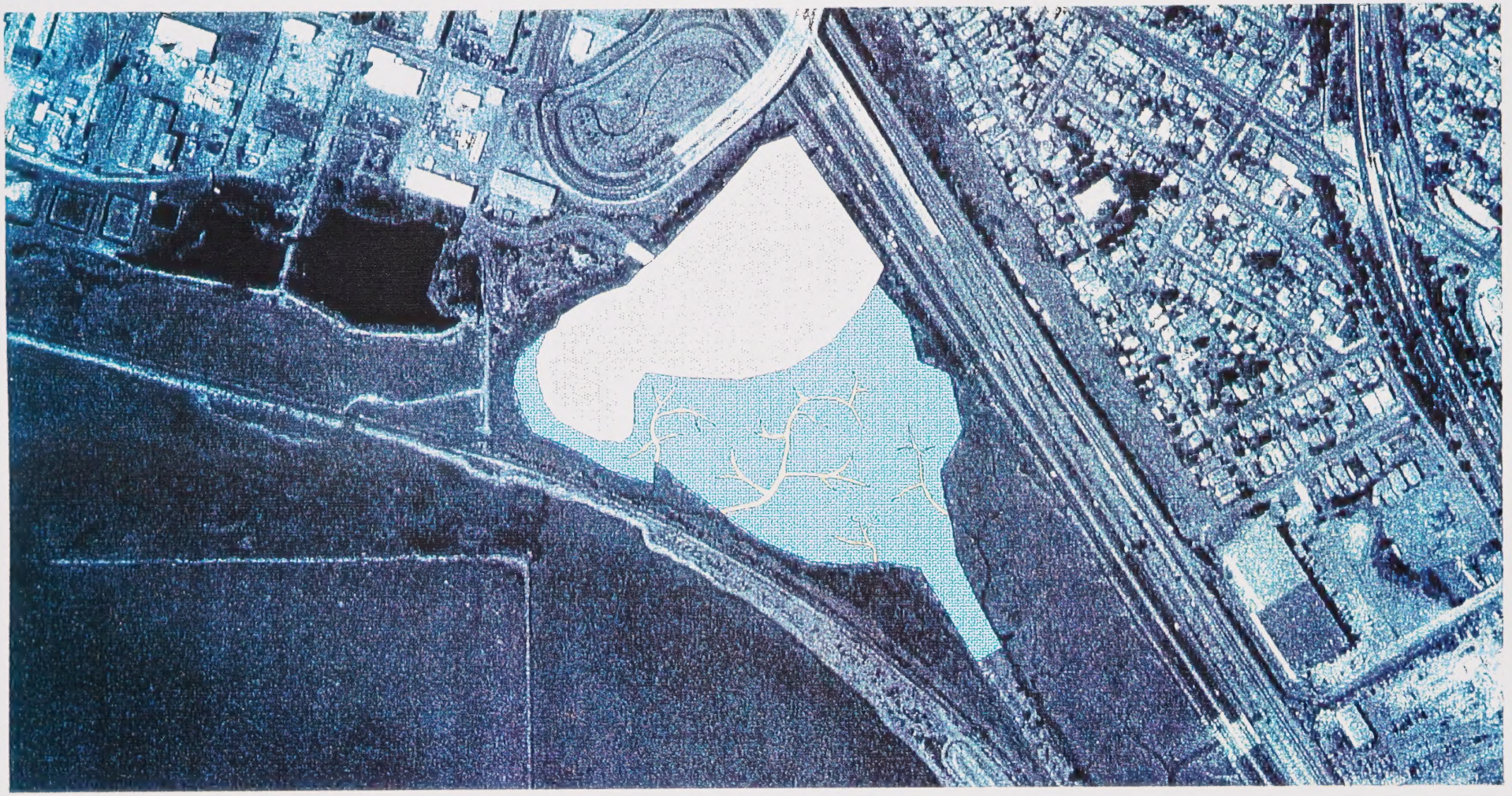
Conceptual Plan for the Proposed Mitigation at the Breuner Property

Not to Scale

Figure 4-2



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Conceptual Plan for the Proposed Mitigation
at the Liquid Gold Site

Not to Scale

Figure 4-3

5.1 EELGRASS MITIGATION

Caltrans will implement eelgrass mitigation before or concurrently with project construction. On-site eelgrass mitigation consists of two major components. First, Caltrans will harvest eelgrass from the location of the barge access channel. This eelgrass will then be transplanted in adjacent eelgrass beds outside the direct impact zone. These plots will be monitored to determine success and evaluate planting methodology.

Second, sediment dredged from the barge access channel and sand excavated from the sand flats will be stockpiled to restore a portion of the channel after construction. Immediately after construction is completed, Caltrans will restore to its original bathymetry up to approximately 0.70 hectares (1.73 acres) of the barge access channel where eelgrass beds existed prior to dredging to facilitate colonization by eelgrass. Depending upon the success of the test plots, eelgrass will be transplanted to the site of the original beds using either sediment plugs or the bareroot method. Transplanting will begin in the fall. Merkel and Associates (1998) and Fredette et al (1988) have recommended planting in the fall in the San Francisco Bay due to the higher growth rates in the Bay at this time of year.

Transplanting eelgrass in San Francisco Bay has had mixed results. Zimmerman et al (1995) successfully transplanted eelgrass in the Bay, but other attempts have failed due to poor site location, plant selection, or planting methods. Merkel and Associates (1998) have comprehensively reviewed the eelgrass restoration projects along the West Coast, recommending techniques that have proved successful in the past. The factors that Hanson (1999) recommends for successful transplantation can be met for this project. These recommendations include:

- Conducting a survey to assess the physical conditions of the site, including pilot plantings, before beginning a project;
- Evaluating light availability to ensure that it is adequate for successful eelgrass survival;
- Using stocks for transplanting that are from a site ecologically similar to the transplant site;
- Limiting planting to areas with small tidal ranges to provide greater light availability;
- Utilizing areas where the parameters for deeper vertical distribution are available. This makes the bed less vulnerable to adverse conditions due to availability of energy from deeper shoots; and
- Planting in fall.

5.2 SAND FLAT MITIGATION

To minimize impacts to sand flats at the Oakland Touchdown area, Caltrans will place geotextile fabric and plywood onto the sand flats before installing a geotube After construction, the geotube will be removed and approximately 0.69 hectares (1.70 acres) of the site will be restored to its original bathymetry. The new rock slope protection along this section of the shoreline would be keyed below the existing grade to allow natural deposition of sediment to establish pre-existing conditions in portions of the sand flats temporarily affected by the placement of the geotube. The embankment where the rock slope protection will be placed will have a gradient of 1:3 (V:H) at the toe of the slope and transitioning to a 1:2 gradient at mid-slope to minimize scouring impacts.

The rock slope protection areas will then be capped with soil above the limits of tidal action to provide a medium to support growth of native upland plants and high marsh plants.

The remaining impacts to sand flats will be mitigated by out-of-kind replacement with creation of tidal marsh ecosystem. Implementation of this mitigation is described below.

5.2.1 Tidal Marsh Creation and Enhancement

To minimize temporary impacts, creation of a tidal marsh ecosystem at the Breuner Property or the Liquid Gold site will occur before or concurrently with construction.

At either the Breuner property or the Liquid Gold site, Caltrans will remove upland fill and will grade the tidal marsh areas to elevations between mean lower low water (MLLW) for mudflats and channels and mean higher high water (MHHW) for the upland transition zone. This will allow for daily or intermittent tidal inundation. New primary and/or secondary channels may be created or smaller channels will be allowed to develop naturally. Native wetland and upland vegetation will be planted at the site at elevations appropriate to the species.

The Breuner property and the Liquid Gold site present ideal opportunities for wetland restoration because they are located adjacent to high quality tidal marsh areas. The adjacent marsh areas, Giant and Hoffman marshes, respectively, will result in greater habitat values for the restored marsh habitats. Larger blocks of habitat are less affected by short-term disturbances, support greater diversities of species and are utilized by larger numbers of species. No water control structures will be required because both sites have excellent connections to the Bay and can be graded to the appropriate elevations to meet the desired mix of habitats.

Caltrans will implement mitigation monitoring to evaluate success, identify problems and implement corrective measures as needed. The following monitoring methodology will be developed in greater detail with the development of the detailed mitigation plans.

6.1 ON-SITE AVOIDANCE AND MINIMIZATION MEASURES

Caltrans will implement monitoring for all on-site avoidance and minimization measures. Construction monitoring will evaluate the following parameters:

- Placement of a geotextile fabric and plywood beneath the geotube and removal of the geotube after construction;
- Detailed bathymetry of the barge access channel before dredging to establish elevations for restoration of eelgrass beds after construction;
- Enforcement of wetland and eelgrass avoidance including maintenance of ESA markers and fencing; and
- Removal of all temporary construction access structures (e.g. trestles).

6.2 TIDAL MARSH AND MUDFLAT CREATION AND ENHANCEMENT

The monitoring plan for the Breuner Property or Liquid Gold site, depending on which site is selected as project mitigation, will include:

- Vegetation monitoring to determine cover, species composition and survival of individual plantings;
- Hydrological monitoring to determine extent of inundation, channel depth, channel cross-sectional area, sedimentation rates and other identified parameters as needed;
- Photodocumentation of the mitigation site at designated locations;
- Monitoring for special status species (e.g. salt marsh harvest mouse); and
- Ornithological monitoring to document bird density and diversity in the area, including special status species such as the California clapper rail and black rail.

Newly created and restored wetland areas will be monitored for five years.

6.3 EELGRASS MITIGATION

Pre- and post-construction data will be collected for the eelgrass site for comparison after the mitigation has been completed. The monitoring program will include measurement of the density of the eelgrass beds. Modified hydrolab(s) that measure light irradiance (photosynthetically active radiation, or PAR), turbidity, depth, salinity and temperature will be placed above the eelgrass beds (Langis et al. 1999). These will measure the relationship between light availability (PAR) and the estimated hours of irradiance-saturated photosynthesis (H_{sat}) necessary for maintenance and growth. The average H_{sat} values will be calculated from the PAR measurements and compared to the H_{sat} values necessary to sustain the health of the eelgrass.

6.4 MAINTENANCE DURING MONITORING PERIOD

Caltrans will be responsible for routine maintenance during the monitoring period. Sand flat maintenance will include clearing the area of any debris that may be deposited on the restored area. Tidal marsh maintenance activities will include replacing failed plantings, removing non-native species, watering as needed, installing browse protection for vegetation or other measures to facilitate success of the restored wetlands.

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APPENDIX O
MEMORANDUM OF AGREEMENT

Memorandum of Agreement

Among
the Federal Highway Administration,
the United States Coast Guard,
the California State Historic Preservation Officer
and the Advisory Council on Historic Preservation
For the San Francisco Oakland Bay Bridge East Span Seismic Safety Project
in San Francisco and Alameda Counties, California

WHEREAS, the Federal Highway Administration (FHWA) proposes to approve design changes to the Interstate system and possibly to fund a seismic safety project for the east span of the San Francisco-Oakland Bay Bridge (Undertaking) proposed by the California Department of Transportation (Caltrans); and

WHEREAS, the four build alternatives being considered for this Undertaking include retrofit of the existing structure, constructing a replacement bridge to the south of the existing bridge, and constructing a replacement bridge to the north of the existing bridge on one of two possible alignments; and

WHEREAS, FHWA will be the lead federal agency for this Undertaking ; and

WHEREAS, the United States Coast Guard (Coast Guard) has independent review responsibilities for its bridge permit for navigational features; and

WHEREAS, portions of this Undertaking will occur on lands currently under the federal jurisdictions of the Department of the Navy (Navy) and the Coast Guard, and

WHEREAS, the Undertaking will include transfer of land, or interest in land, necessary for the Undertaking, under United States Department of Transportation (USDOT) authority pursuant to Title 23 of United States Code (U.S.C.) Section 107(d) and acquisition of such land has been delegated by the Secretary of Transportation to FHWA, which would then transfer the land to Caltrans; and

WHEREAS, such land transfer will not include title to any historic properties with the exceptions of the archaeological site CA-SFr-04/H and the air space over the Navy Building 262; and

WHEREAS, this Undertaking may adversely affect historic properties listed or eligible for listing on the National Register of Historic Places, including the San Francisco-Oakland Bay Bridge, the Navy Building 262, the Naval Officers' Quarters Historic District, the Key Pier Substation, and archaeological site CA-SFr-04/H, and may have effects on archaeological properties that have not yet been identified; and

WHEREAS, Naval Station Treasure Island Base Closure and Reuse is a separate Undertaking from the subject Undertaking; and

WHEREAS, FHWA has consulted with the California State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (Council) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and

WHEREAS, FHWA and Caltrans have consulted with local governments; the Department of the Navy; City of Oakland and City and County of San Francisco; the Foundation for San Francisco's Architectural Heritage; the San Francisco Planning & Urban Research Association; the Mayor's Treasure Island Project Office; the National Park Service (Western Regional Office); the National Trust for Historic Preservation; the California Preservation Foundation; the Oakland Landmarks Preservation Advisory Board; the San Francisco Landmarks Preservation Advisory Board; the Oakland Cultural Heritage Survey; the Port of Oakland; the Oakland Heritage Alliance and the Oakland Department of Public Works about the Undertaking and its effects on historic properties, and have taken all comments received from these parties into account; and

WHEREAS, FHWA and Caltrans have consulted with the following non-federally recognized Ohlone Native Americans identified by the California Native American Heritage Commission as Native American groups and individuals with a potential interest in the project area about the effects of the Undertaking on archaeological properties, and have taken all comments received from these parties into account: Chairperson Rosemary Cambra of the Muwekma Indian Tribe, Chairperson Tony Cerda of the Costanoan Rumsen Carmel Tribe, Mr. Andrew Galvan of The Ohlone Indian Tribe, Ms. Jakki Kehl, Mr. Kenneth Marquis, Ms. Jenny Mousseaux (Mcleod), Mr. Patrick Orozco, Ms. Katherine Erolinda Perez, Mr. Alex Ramirez, Chairperson Rudy Rosales of the Ohlone/Costanoan-Esselen Nation, Chairperson Ann Marie Sayer of the Indian Canyon Mutsun Band of Costanoan, Ms. Linda G. Yamane and Chairperson Irene Zwierlein of the Amah Tribal Band; and

WHEREAS, all non-federally recognized Ohlone Native Americans listed above will be invited to concur in the Agreement and to participate in the development and implementation of the Research Design and Treatment Plan (Treatment Plan); and

WHEREAS, Caltrans, the Department of the Navy, the City of Oakland and the City and County of San Francisco have been or will be invited to concur in the Agreement,

NOW, THEREFORE, FHWA, the Coast Guard, the SHPO, and the Council agree that the Undertaking will be implemented in accordance with the following stipulations in order to take into account the effect of the Undertaking on historic properties.

STIPULATIONS

FHWA will ensure that the following stipulations are carried out as applicable:

I. Applicability of Stipulations

A. Retrofit existing bridge

If the alternative chosen is to retrofit the existing bridge, the following stipulations will be carried out: II, III.E, III.G, IV.A, IV.B, V.A, V.B, V.C, V.D, and VII through XII.

B. Replacement bridge to south of existing bridge

If the alternative chosen is a replacement bridge to the south of the existing bridge, all of the stipulations in this Agreement will be carried out except for IV.C and V.D.

C. Replacement bridge to north of existing bridge

If the alternative chosen is a replacement bridge to the north of the existing bridge, all of the stipulations in this Agreement will be carried out except for V.D.

II. Professional Standards

All activities regarding history, historic preservation, historical archaeology and prehistoric archaeology that are carried out pursuant to this Agreement will be carried out by or under the direct supervision of persons meeting at a minimum the Secretary of the Interior's professional qualifications standards (48 FR 44738–9) in these disciplines.

III. Mitigation of effects on the San Francisco–Oakland Bay Bridge (Bay Bridge)

A. Salvage

Caltrans will offer selected components of the bridge to the East Bay Regional Park District or other owner of the proposed Oakland touchdown park (south of the new bridge, between the toll plaza and the shoreline in Oakland), for display or other use in the park. Caltrans will also provide the Oakland Museum of California, the Western Railway Museum in Rio Vista, Solano County, and any other interested parties an opportunity to select components of the bridge for curation, display, or other appropriate use. Caltrans will remove the items selected in a manner that minimizes damage and will deliver them with legal title to the recipient.

B. Permanent interpretive exhibits

1. Caltrans will consult with the East Bay Regional Park District or other owner of the proposed Oakland touchdown park about their interest in having interpretive exhibits incorporated into the design of the park which describe the Bay Bridge as originally constructed. If consultation results in agreement between Caltrans and the park owner concerning the nature and extent of the exhibits before January 1, 2008, Caltrans will produce and install the exhibits. The interpretive exhibits may include, but are not necessarily limited to: plaques or markers, salvaged components of the bridge, a mural or other depiction of the bridge, and the large clock that formerly stood atop the toll plaza canopy.

2. If consultation does not result in agreement between Caltrans and the park owner, Caltrans will seek an alternative East Bay location for the interpretive exhibits. Appropriate alternative locations may include Marina Park in Emeryville or the Berkeley Pier.

3. Caltrans will also consult with the City and County of San Francisco about their interest in having similar interpretive exhibits on Yerba Buena Island, and will produce and install the exhibits only if consultation results in agreement between Caltrans and the City and County of San Francisco before January 1, 2008.

C. Museum exhibit

1. Caltrans will consult with the Oakland Museum of California, the Academy of Sciences in San Francisco and/or other Bay Area museums about their interest in preparing and presenting an exhibit relating to the history and engineering of the major bridges of the San Francisco Bay, and will discuss with an interested museum the scope, content, and cost of such an exhibit.

2. If this consultation results in agreement between Caltrans and a museum to prepare and present such an exhibit, Caltrans will identify and conserve documentary materials in its possession related to the Bay Bridge and other major bridges of the San Francisco Bay that are considered most appropriate for such an exhibit, possibly including photographs, drawings, videotape, models, oral histories, and salvaged components from the bridges. In addition, Caltrans will assist the museum by contributing to the cost of preparing and presenting the exhibit, as well as the cost of an exhibit catalog or related museum publication in conjunction with the exhibit, in a manner and to the extent agreed upon by Caltrans and the museum.

D. Permanent curation and display of exhibit materials

At the conclusion of the museum exhibit described in Stipulation III.C., Caltrans will select historic items and interpretive materials from the exhibit to be offered to local governments, historical societies, and other interested parties in the Bay Area for permanent curation and public display. Caltrans will notify potential public and non-profit venues, which Caltrans has determined meet acceptable curation standards, of the availability of materials and will deliver the materials at its own expense to the selected venues. In the event there are multiple requests for the same items, Caltrans shall consider the proposals submitted by the requesters for the materials and shall decide which party shall receive the item, based on the ability of the requester properly to curate and exhibit the item.

E. Oral history

Caltrans will produce oral history documentation related to the construction and operation of the Bay Bridge, which will include audiotape and transcripts and may also include videotape. Caltrans will select appropriate subjects for interviews, who may include engineers and construction workers who participated in the construction of the bridge, bridge maintenance workers, bridge railway train operators, and others whose lives were affected by the bridge. Copies of the documentation will be provided to the Bancroft Library of the University of California at Berkeley, the Oakland History Room of the Oakland Public Library, the History Center at the San Francisco Public Library, the California Historical Society, and the Oakland Museum of California.

F. Documentary videos

1. Caltrans will provide copies of one or more of the existing documentary videos about the construction of the Bay Bridge to the public libraries of Oakland, San Francisco, Emeryville and Berkeley, as well as the California Historical Society.

2. In addition, Caltrans will produce curriculum materials to accompany the videos and will provide the curriculum materials and videos to the public school systems of Oakland, San Francisco, Emeryville and Berkeley, and to other school districts upon request.

3. Within 180 days after FHWA determines that the Undertaking has been completed, FHWA, in consultation with the SHPO, will re-evaluate the Bay Bridge, a property listed on the National Register of Historic Places, and determine whether the National Register nomination should be amended or whether the bridge no longer qualifies for listing and should be removed from the National Register. As appropriate, FHWA will prepare and submit to the SHPO either an amended nomination or petition for removal, to be processed according to the procedures set forth in 36 CFR Part 60 (60.14 and 60.15).

IV. Mitigation of effects on Navy Building 262 on Yerba Buena Island

A. Protective measures

Caltrans, in consultation with the property owner, will develop and implement measures to protect Building 262 from damage by any aspect of the Undertaking. Such measures will include, but not necessarily be limited to, vibration monitoring during pile driving in the vicinity of this building. The protective measures will be included in the contract specifications and in Caltrans' Resident Engineer's "pending" file.

B. Repair of inadvertent damage

Caltrans will ensure that any damage to Building 262 resulting from the Undertaking will be repaired in accordance with the Secretary of the Interior's *Standards for Rehabilitation.* Caltrans will photographically document the condition of the building prior to the start of the Undertaking to establish the baseline condition for assessing damage. A copy of this photographic documentation will be provided to the Navy and the City and County of San Francisco. Prior to implementation, Caltrans shall provide the plans for any repairs to the SHPO for review and comment to ensure conformance with the Secretary of the Interior's Standards for Rehabilitation.

C. Historic Structure Report

Caltrans will prepare or fund the preparation of an historic structure report for Building 262, to promote the reuse of this building. The historic structure report will, at a minimum, describe the significance and historic uses of the building; identify and assess the condition of original materials; describe later alterations; assess the structural condition of the building, including seismic safety considerations; and make recommendations for future seismic retrofit, other structural improvements, and appropriate preservation treatments. The scope of the historic structure report will be developed in consultation with the property owner. Copies of the report will be provided to the Navy and the City and County of San Francisco for review and to the SHPO for its records.

V. Mitigation of effects on the Naval Officers' Quarters Historic District, Quarters 8, Quarters 10, and Building 267 on Yerba Buena Island

A. Protective measures

Caltrans, in consultation with the Navy and the Coast Guard, will develop and implement measures to protect the Naval Officers' Quarters Historic District, Quarters 8, Quarters 10, and Building 267 from damage by any aspect of the Undertaking. The protective measures will be included in the contract specifications and in Caltrans' Resident Engineer's "pending" file.

B. Repair of inadvertent damage to buildings

Caltrans will ensure that any damage to the buildings of the Naval Officers' Quarters Historic District, Quarters 8, Quarters 10, or Building 267 resulting from the Undertaking will be repaired in accordance with the Secretary of the Interior's Standards for Rehabilitation. Caltrans will photographically document the condition of these buildings prior to the start of the Undertaking to establish the baseline condition for assessing damage. A copy of this photographic documentation will be provided to the Navy, the Coast Guard, and the City and County of San Francisco. Prior to implementation, Caltrans shall provide the plans for any repairs to SHPO for review and comment to ensure conformance with the Secretary of the Interior's Standards for Rehabilitation.

C. Restoration of the grounds

1. Caltrans will ensure that the grounds within the National Register boundaries of the Naval Officers' Quarters Historic District, Quarters 8, and Quarters 10 are restored after completion of the bridge project and removal of all temporary structures, to their condition prior to the start of the Undertaking. Caltrans will photographically document the grounds of these properties prior to the start of the Undertaking to establish the baseline condition for restoration. A copy of this photographic documentation will be provided to the Navy, the Coast Guard, and the City and County of San Francisco. Restoration of the grounds will include, but will not necessarily be limited to: new sod in grass areas, replacement of shrubbery and trees; regrading and revegetation of disturbed slopes; repair or replacement of damaged paving, sidewalks and curbs.

2. The Undertaking includes revegetation of disturbed slopes, including the areas south of the Naval Officers' Quarters Historic District and southeast of Quarters 10, which currently screen the existing bridge from these historic properties. Caltrans will establish construction limits in this area to preserve as much of the existing vegetation around Quarters 1 as possible, and will develop and implement a revegetation plan for affected areas, including the planting of mature trees, monitoring, and replanting as necessary to ensure success of the plan, in order to return the slope behind Quarters 1

to a natural appearance and to establish visual screening of the bridge comparable to the existing condition.

D. Screen planting in front of YB-3

In consultation with the property owner, Caltrans will develop and implement a planting plan to screen the concrete-encased pier YB-3 from Quarters 1, a property within the Naval Officers' Quarters Historic District and individually listed on the National Register of Historic Places, by planting along the top of the slope at the east end of the Naval Officers' Quarters Historic District.

VI. Minimizing Visual and Physical Impacts on Historic Properties on Yerba Buena Island

A. Design Features

FHWA shall ensure that the final design for any replacement structure minimizes visual and physical impacts to the Officers' Quarters Historic District and other historic properties with regard to the following features: color of concrete surface; texture of concrete surface; size, type and spacing of bridge deck light standards; bridge accent lighting, if it is considered; bridge suspension cables uplighting; landscaping restoration around the historic district; signage in the vicinity of the Historic District; number, mass, spacing of bridge piers; and height of the deck.

B. Review of Design Features

FHWA will afford the Council and SHPO the opportunity to review the design for the specific features cited in section A. of this stipulation, and will provide the Council and SHPO with documentation relevant to that review. The Council and SHPO shall have thirty (30) days after receipt to review and comment on this documentation. If the Council or SHPO so requests, FHWA, Caltrans, and any project design consultants, will meet with the Council and SHPO during the time frame stipulated, to address any Council or SHPO comments. Absent objection from the Council or SHPO within the stipulated time frame, FHWA may assume Council and SHPO concurrence with the proposed design and authorize Caltrans to proceed with final design. Final design documents will not be subject to further review under this Agreement. If the Council or SHPO objects within the stipulated time frame, FHWA will proceed in accordance with Stipulation X., below, to resolve the objection, except that objections pertaining to the number, mass, and spacing of bridge piers, or to the height of the bridge deck, will be exempt from Stipulation X. Objections exempt from Stipulation X. will be taken into account by FHWA before it authorizes Caltrans to proceed with final design.

C. Construction period

Caltrans shall take all practical measures to minimize the construction period of the project, particularly the period of use of temporary structures in the vicinity of the Officers' Quarters Historic District.

VII. Mitigation of effects on archaeological properties and development and implementation of a Treatment Plan for Archaeological Resources

FHWA will ensure that all required archaeological work is carried out by Caltrans or Caltrans' consultants.

A. Treatment plan development

Caltrans will prepare a comprehensive Treatment Plan for archeological resources. The Treatment Plan will include a data recovery plan for the prehistoric component of CA-SFr-4/H, guidelines for evaluation and data recovery of any American Period deposits within CA-SFr-4/H, as well as for treatment of unanticipated discoveries of any other archaeological deposits within the area of the Undertaking. The Treatment Plan will be consistent with the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation (48 FR 44734–37) and take into account the Council's publication, Treatment of Archaeological Properties: A Handbook (ACHP 1980), and SHPO guidelines.

B. Treatment Plan specifics

The Treatment Plan will specify, at a minimum:

a. the properties or portion of properties where evaluation and/or data recovery are to be carried out;
b. the properties, if any, that will be affected by the Undertaking but for which no data recovery will be carried out;
c. the manner in which any unanticipated discoveries will be treated;
d. the research questions to be addressed through data recovery, with an explanation of their relevance and importance;
e. the methods to be used for data recovery, with an explanation of their relevance to the research questions;
f. the methods to be used in analysis, data management, and dissemination of data, including a schedule;
g. the proposed disposition of recovered materials and records;
h. the manner in which any human remains and sacred objects of Native American origin on federal or non-federal lands will be treated;

i. coordination with interested Native Americans during development and implementation of the Treatment Plan;

j. the proposed methods for disseminating results of the work;

k. a plan to comply with NAGPRA, if appropriate.

l. archival research required to establish context for evaluation of any American Period deposits found and to predict types of other archaeological properties that may be buried within the area of the Undertaking.

C. Treatment Plan review

Caltrans will coordinate with tribes and other interested Native Americans during the development of the Treatment Plan to solicit their views on the contents of the Treatment Plan, the public interpretive material, treatment of burials, the scope of the data recovery, and other topics of interest to Native Americans. Caltrans, in consultation with interested Native Americans, will develop a process for determining appropriate tribal affiliation should there be a discovery of human remains.

Caltrans will submit the Treatment Plan to all parties to this Agreement and interested Native Americans for a thirty (30) calendar day review following receipt of the Plan. If any party fails to submit their comments within thirty (30) days, Caltrans may assume that party's concurrence with the Treatment Plan. Caltrans will take any review comments into account, revise the Treatment Plan accordingly, and will notify any party whose comments were not incorporated into the Treatment Plan. Any disputes arising under the terms of this stipulation and not able to be solved by consensus will be resolved in accordance with Stipulation X.

D. Notification

Caltrans will promptly notify the SHPO, the Navy and the Coast Guard, as appropriate, if any properties are found that meet the conditions for eligibility set forth in the Treatment Plan. Absent objection pursuant to Stipulation X, Caltrans may combine the evaluation and data recovery phases of treatment of American Period or previously unidentified archaeological deposits and proceed in accordance with the Treatment Plan for any properties that meet the conditions for eligibility set forth in the Treatment Plan, and terminate any further consideration of properties which do not meet such conditions.

E. Report standards and dissemination

Caltrans will ensure that all reports resulting from implementation of the Treatment Plan meet contemporary professional standards and the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation (48 FR 44734–37). Copies of all final reports will be provided to the SHPO, the Northwest Information Center at Sonoma State University, the Navy, Coast Guard and other interested parties as appropriate, such as

Native Americans, the Native American Heritage Commission, historical societies, and professional and amateur archaeological societies.

F. Public interpretive materials

Caltrans will develop public interpretive materials, covering potential historical and archaeological resources within the project area, and will disseminate these materials to both the public at large and educational institutions. Interpretive materials may include, but are not necessarily limited to: a mobile exhibit on the archaeology and history of Yerba Buena Island, curriculum materials, a web site, and other public presentations.

G. Confidentiality

The signatories to this Agreement acknowledge that historic properties covered by this Agreement are subject to the provisions of § 304 of the National Historic Preservation Act of 1966 and § 6254.10 of the California Government Code (Public Records Act), relating to the disclosure of archeological site information and, having so acknowledged, will ensure that all actions and documentation prescribed by this Agreement are consistent with § 304 of the National Historic Preservation Act of 1966 and § 6254.10 of the California Government Code.

VIII. Annual report

Caltrans will prepare an annual report describing the status of its efforts to comply with the mitigation measures set forth in Stipulations III through VII of this Agreement. The annual report will be prepared following the end of each fiscal year (July 1 to June 30) and will be distributed by Caltrans to all of the signatories to this Agreement by July 30 of each year, until FHWA determines that the *applicable* mitigation measures set forth in Stipulations III through VII inclusive, of this Agreement have been completed.

IX. Amendments, termination and new agreement

A. Amendments

If any signatory to this Agreement determines that an amendment to its terms should be made, the signatory will immediately consult with the other signatories to this Agreement pursuant to 36 CFR 800.6 (c)(7). This agreement may be amended only upon written concurrence of all signatory parties.

B. Termination

If the signatory parties to this Agreement do not reach consensus on amendment(s) as provided for in this stipulation, FHWA, the Council or the SHPO may terminate it. The party terminating the Agreement will in writing provide all other signatories with an explanation of the reasons for termination. If the Agreement is not amended or terminated, the Agreement will remain in effect as originally executed, and FHWA will notify the other signatories that the attempt to reach consensus on amendment(s) was unsuccessful.

C. Action following termination

If this Agreement is terminated by FHWA, the Council or the SHPO for any reason, and FHWA determines that the Undertaking will proceed, FHWA will execute a new Memorandum of Agreement with the signatories under 36 CFR 800.6, or request the comments of the Council pursuant to 36 CFR 800.7(a).

X. Dispute resolution

A. Disputes regarding actions

1. Should any signatory to this Agreement object to the manner in which the terms of this Agreement are implemented, or to any documentation prepared in accordance with and subject to the terms of this Agreement, FHWA will consult further with the objecting party to resolve the objection. If FHWA determines within fourteen (14) days of receipt that such objection cannot be resolved, FHWA will forward all documentation relevant to the dispute to the Council, including FHWA's proposed response to the objection. Within thirty (30) days after receipt of all pertinent documentation, the Council will:

   a. advise FHWA that it concurs in FHWA's proposed response, whereupon FHWA will respond to the objection accordingly; or

   b. provide FHWA with recommendations which FHWA will take into account in reaching a final decision regarding the dispute.

2. Any Council comment provided in response to FHWA's request will be taken into account by FHWA with reference only to the subject of the dispute. The signatories' responsibilities to carry out all actions under this Agreement that are not the subject of the dispute will remain unchanged. FHWA may authorize Caltrans to implement that portion of the Agreement which is subject to dispute after receiving and taking into account, any Council comments issued in accordance with this stipulation. FHWA's decision regarding resolution of the dispute will be final.

3. If the Council fails to comment within the time period specified in this stipulation, FHWA may authorize Caltrans to implement that portion of the Agreement which is subject to dispute in accordance with FHWA's proposed response to the objection as submitted to the Council, and after taking into account any SHPO or Council comments. FHWA's decision regarding resolution of the dispute will be final.

XI. Public objections

If any member of the public objects to the manner in which the provisions of this Agreement are implemented, FHWA shall immediately notify the other parties in writing of the objection and take the objection into account. FHWA shall consult with the objecting party and, if the objecting party so requests, with any or all of the other signatories, for no more than thirty (30) calendar days. Within fourteen (14) calendar days following closure of the consultation period, FHWA will render a decision regarding the objection and notify all parties of this decision in writing. In reaching its decision, FHWA will take comments from all parties into account. . No provision of this stipulation will preclude FHWA and Caltrans from continuing to implement any provision of the Agreement that is subject to public objection.

XII. Duration

A. Reconsideration

If FHWA determines that construction of the Undertaking has not been initiated within ten years following execution of this Agreement, the signatories shall consult to reconsider its terms. Reconsideration may include continuation of the Agreement as originally executed, amendment, or termination in accordance with Stipulation IX.

B. Terms fulfilled

This Agreement will be in effect through FHWA's implementation of the Undertaking, and will terminate and have no further force or effect when FHWA, in consultation with the other signatories, determines that the terms of this Agreement have been fulfilled in a satisfactory manner. FHWA will provide the other signatories with written notice of its determination and of termination of this Agreement.

Execution and implementation of this Agreement evidence that FHWA and the Coast Guard have afforded the Council a reasonable opportunity to comment on the Undertaking and the effect of the Undertaking on historic properties, and have themselves taken into account the effect of the Undertaking on historic properties.

Federal Highway Administration

By: David A. Nicol Date: 25 May 00

Title: Assistant Division Administrator

United States Coast Guard

By: R Jankowsky CAPT, USCG Date: 25 May 00

Title: Chief, Civil Engineering Division

California State Office of Historic Preservation

By: Daniel Abeyta Date: 25 May 00

Title: Acting SHPO

Advisory Council on Historic Preservation

By: John M. Fowler Date: 5/26/00

Title: EXECUTIVE DIRECTOR

Concurring Parties:

Concur:
United States Navy

By: _____ Date: _____

Title: _____

Concur:
California Department of Transportation

By: Tony V. Harris Date: 5/25/00

Title: Acting Director

Concur:
City of Oakland

By: _____ Date: _____

Title: _____

Concur:
City and County of San Francisco

By: _____ Date: _____

Title: _____

Concur:
Chairperson Rosemary Cambra, Muwekma Indian Tribe

By: _____ Date: _____

Concur:
Chairperson Tony Cerda, Costanoan Rumsen Carmel Tribe

By: _____ Date: _____

Concur:
Mr. Andrew Galvan, The Ohlone Indian Tribe

By: Andrew A Galvan Date: 14 VII 2000
Feast Day of Blessed Kateri Tekawitha

Concur:
Ms. Jakki Kehl

By: _____ Date: _____

Concur:
Mr. Kenneth Marquis

By: _____ Date: _____

Concur:
Ms. Jenny Mousseaux (Mcleod)

By: _____ Date: _____

Concur:
Mr. Patrick Orozco

By: _____ Date: _____

Concur:
Ms. Katherine Erolinda Perez

By: _____ Date: _____

Concur:
Chairperson Tony Cerda, Costanoan Rumsen Carmel Tribe

By: _____ Date: 6/27/00

Concur:
Mr. Andrew Galvan, The Ohlone Indian Tribe

By: _____ Date: _____

Concur:
Ms. Jakki Kehl

By: _____ Date: _____

Concur:
Mr. Kenneth Marquis

By: _____ Date: _____

Concur:
Ms. Jenny Mousseaux (Mcleod)

By: _____ Date: _____

Concur:
Mr. Patrick Orozco

By: _____ Date: _____

Concur:
Ms. Katherine Erolinda Perez

By: _____ Date: _____

Concur:
Mr. Alex Ramirez

By: _____ Date: _____

Concur:
Chairperson Rudy Rosales, Ohlone/Costanoan-Esselen Nation

By: _____ Date: _____

Concur:
Chairperson Ann Marie Sayer, Indian Canyon Mutsun Band of Costanoan

By: Ann Marie Sayer Date: July 20, 06

Concur:
Ms. Linda G. Yamane

By: _____ Date: _____

Concur:
Chairperson Irene Zwierlein, Amah Tribal Band

By: _____ Date: _____

I would like to see more input from the native American people & history & contributions of the original people. This is as though we are invisible

APPENDIX P
NOISE ABATEMENT ANALYSIS

APPENDIX P

Noise Abatement Analysis

Noise abatement measures (e.g., construction of a noise barrier) were considered for reducing noise impacts when the predicted peak-noise-hour levels were expected to approach or exceed FHWA Noise Abatement Criteria (NAC) for appropriate land use categories (see Table 3.5-1). For this project, noise abatement measures were considered and evaluated for effectiveness based upon the FHWA NAC.

The noise abatement analysis evaluated the acoustical effectiveness of noise barriers. Noise barriers must reduce future predicted noise levels at impacted receptors by at least five dBA to be considered feasible. The feasibility criterion is not necessarily a noise abatement design goal. Greater noise reductions are encouraged if they can be reasonably achieved. Feasibility may be restricted by topography, access requirements for ramps, other noise sources in the area and safety considerations. Reasonableness of noise barriers must be evaluated as well, including such additional factors as cost per benefited receptor, absolute noise levels, change in noise levels, viewshed preservation, appearance, views of impacted residents, input from other agencies, and other social, economic, environmental, legal and technological factors. Noise insulation of residential dwellings is typically only considered when severe traffic noise impacts are predicted and normal abatement measures are not physically feasible or economically reasonable. Because substantial noise impacts are not predicted for any of the project alternatives, noise insulation of structures was not considered. When affected receptors experience traffic noise levels or increases considerably greater than at other similar receptors, extraordinary abatement measures may be justified. Examples of such situations include private residential units with noise levels greater than 75 dBA L_{eq} after project implementation or a predicted noise level increase of 30 dBA or more as a result of the project. The SFOBB East Span Project would not cause any such increases.

The effectiveness of a range of soundwall heights from 1.8 to 4.9 meters (6 to 16 feet) was tested using the criteria of reducing noise levels a minimum of five dBA at the receptor. In addition, for a soundwall to be considered effective, it must interrupt the line-of-sight between the receptor (assumed to be 1.5 meters [5 feet] tall) and an exhaust stack of a heavy-duty truck. The truck-stack height is considered to be 3.5 meters (11.5 feet) above the roadway surface. If soundwalls are installed, they should be constructed along the outer edges of the bridge decks for maximum noise abatement effectiveness.

Replacement Alternative N-2.

Yerba Buena Island. The noise levels at Locations 2, 3, 4, 9, and 11 would equal or exceed the 67 dBA L_{eq} standard, therefore, noise abatement measures have been considered. Practical noise measures that effectively reduce these modeled noise levels consist of barriers, due to the limitations of other abatement measures for bridge structures such as berms and buffer zones. Installation of the barriers summarized below would result in soundwalls extending along both sides of the existing bridge structure wherever I-80 is above land on YBI. The soundwall locations which would be required to

reduce noise levels by 5 dB or more and break truck-stack line-of-sight between receptors and truck exhaust stacks are summarized below and presented in Table P-1. (See Figure 4-16 in Appendix A for potential soundwall locations for Alternative N-2.) Soundwalls would be ineffective for Locations 9 and 11 as Replacement Alternative N-2 would place the bridge above these locations.

On the northern side of the bridge, two 4.27-meter (14-foot) high walls 245 meters (800 feet) long at each of the bridge decks exiting YBI would reduce noise levels 5 dBA or more and break truck-stack line-of-sight. Together, the walls would provide effective noise reduction for approximately 90 residential units at Location 2. Both the U.S. Navy and the City and County of San Francisco have expressed their desire to rent out these residential units on YBI. From Station 52+40 to Station 53+40 SW-2A and SW-2B would be 3.05 meters (10 feet) high, with a 3.66-meter (12-foot) transition area from Station 52+00 to Station 52+40. The soundwalls would need to be approximately 140 meters (459 feet) in length to provide effective noise reduction to the one residence at Location 3. On the south side of the bridge, walls 3.66 meters (12 feet) in height on both bridge decks exiting the tunnel would reduce noise levels 5 dB or more and break truck-stack line-of-sight. These walls would extend for 245 meters (800 feet) to the east of the tunnel portal. These walls would provide noise reduction for the one residence at Location 4.

Oakland Touchdown Area. One of the ten modeled receptors for Replacement Alternative N-2 (Receptor 17-M1) in the Oakland Touchdown area has a peak-noise-hour level which exceeds the FHWA NAC for Activity Category C of 72 dBA L_{eq}. However, there are no exterior areas of frequent human use for which lower noise levels would be of benefit.

Replacement Alternative N-6

Yerba Buena Island. The noise levels at Locations 2, 3, 4, 9, and 11 would equal or exceed the 67 dBA L_{eq} criteria.

On the northern side of the bridge, two 4.27-meter (14-foot) high walls 245 meters (800 feet) long at each of the bridge decks exiting YBI would reduce noise levels 5 dB or more and break truck-stack line-of-sight. Together, the walls would provide effective noise reduction for approximately 90 residential units at Location 2. These walls would transition to 3.66 meters (12 feet) in height for 140 meters (460 feet) in length and would provide noise reduction for the one residence at Location 3. On the south side of the bridge, walls 3.66 meters (12 feet) in height on both bridge decks exiting the tunnel would reduce noise levels 5 dB or more and break truck-stack line-of-sight. These walls would extend for 245 meters (800 feet) to the east of the tunnel portal. These walls would provide noise reduction for the one residence at Location 4. (See Table P-2 in this section and Figure 4-17 in Appendix A for potential soundwall locations for Replacement Alternative N-6.)

Soundwalls would be ineffective for Locations 9 and 11 as Replacement Alternative N-6 would place the bridge above these locations.

TABLE P-1: SUMMARY OF PEAK-NOISE-HOUR NOISE LEVELS: EXISTING AND FUTURE N-2

Location #	Noise Receptor	Modeled Existing Noise Level L_{eq} (dBA)	Future-N-2 Alignment Noise Level L_{eq} (dBA)	Soundwall Number and Begin/End Stations	Soundwall Placement	Soundwall Height (meters)**	Noise Level (dBA) with Different Wall Heights						Wall Ht. Required to Break L-O-S (m)**
							1.83m**	2.44m**	3.05m**	3.66m**	4.27m**	4.88m**	
1	1A	72	62	N/A	N/A	None							
	1C	70	63	N/A	N/A	None							
	1-LT	71	61	N/A	N/A	None							
	1-M1	74	64	N/A	N/A	None							
	1-M2	70	62	N/A	N/A	None							
	1-M3	69	62	N/A	N/A	None							
	1-M4	70	62	N/A	N/A	None							
	1-M5	75	64	N/A	N/A	None							
2	2A	74	73	SW 1A,1B (2)	E/B	4.27	72	70	69	67	66	65	4.2
	2-M1	71	70	SW 1A,1B (2)	E/B	4.27	69	67	66	65	63	62	4.0
3	3A	75	71	SW 2A,2B (1)	E/B	3.05	68	66	65	63	62	61	3.0
4	4A	72	70	SW 3A, 3B (2)	E/B	3.66	68	67	65	64	62	61	3.3
5	5A	66	65	N/A	N/A	None							
	5C	64	63	N/A	N/A	None							
	5D	64	60	N/A	N/A	None							
	5-M1	67	65	N/A	N/A	None							
6	6A	72	62	N/A	N/A	None							
	6C	71	61	N/A	N/A	None							
	6-M1	72	62	N/A	N/A	None							
	6-M2	72	61	N/A	N/A	None							
7	7A	69	60	N/A	N/A	None							
	7-M1	71	61	N/A	N/A	None							
9	9A	76	67*	N/A	N/A	None							
	9-M1	76	67*	N/A	N/A	None							
10	10A	77	N/A*	N/A	N/A	None							
	10-M1	77	N/A*	N/A	N/A	None							

E/B = EDGE OF BRIDGE DECK
LOS = LINE OF SITE
N/A = NOT APPLICABLE: NOISE LEVELS EITHER BELOW NOISE ABATEMENT CRITERIA OR MODELING DATA INDICATES THAT A SOUNDWALL WOULD BE INEFFECTIVE
SOUNDWALL STATIONING:
(1) = 52+00 TO 53+40
(2) = 49+55 TO 52+00
*** - THIS ALTERNATIVE WOULD PLACE THE BRIDGE ABOVE OR ON TOP OF THIS LOCATION; SOUNDWALL INEFFECTIVE.**
**** - TO CONVERT TO ENGLISH UNITS, DIVIDE BY 0.3048.**

TABLE P-1: SUMMARY OF PEAK-NOISE-HOUR NOISE LEVELS: EXISTING AND FUTURE N-2 (Continued)

Location #	Noise Receptor	Modeled Existing Noise Level L_{eq} (dBA)	Future-N-2 Alignment Noise Level L_{eq} (dBA)	Soundwall Number and Begin/End Stations	Soundwall Placement	Soundwall Height (meters)**	Noise Level (dBA) with Different Wall Heights						Wall Ht. Required to Break L-O-S (m)**
							1.83m**	2.44m**	3.05m**	3.66m**	4.27m**	4.88m**	
11	11A	75	64	N/A	N/A	None							
	11C	77	68*	N/A	N/A	None							
	11-M1	77	68*	N/A	N/A	None							
	11-M2	77	69*	N/A	N/A	None							
	11-M3	77	69*	N/A	N/A	None							
12	12A	72	N/A*	N/A	N/A	None							
	12-M1	71	N/A*	N/A	N/A	None							
	12-M2	74	N/A*	N/A	N/A	None							
	12-LT	73	N/A*	N/A	N/A	None							
13	13A	73	67	N/A	N/A	None							
	13C	74	70	N/A	N/A	None							
	13-M1	73	67	N/A	N/A	None							
	13-M2	71	68	N/A	N/A	None							
	13-M3	71	68	N/A	N/A	None							
17	17A	66	69	N/A	N/A	None							
	17-M1	70	73	N/A	N/A	None							
18	18A	69	71	N/A	N/A	None							
	18-M1	66	68	N/A	N/A	None							
	18-M2	65	67	N/A	N/A	None							
20	20A	72	62	N/A	N/A	None							
	20-M1	72	62	N/A	N/A	None							
21	21A	74	60	N/A	N/A	None							
	21-M1	73	N/A	N/A	N/A	None							
	21-M2	73	60	N/A	N/A	None							
	21-M3	73	59	N/A	N/A	None							
	STUDIO	67	59	N/A	N/A	None							

E/B = EDGE OF BRIDGE DECK
LOS = LINE OF SITE
N/A = NOT APPLICABLE: NOISE LEVELS EITHER BELOW NOISE ABATEMENT CRITERIA OR MODELING DATA INDICATES THAT A SOUNDWALL WOULD BE INEFFECTIVE
SOUNDWALL STATIONING:
(1) = 52+00 TO 53+40
(2) = 49+55 TO 52+00
*** - THIS ALTERNATIVE WOULD PLACE THE BRIDGE ABOVE OR ON TOP OF THIS LOCATION; SOUNDWALL INEFFECTIVE.**
**** - TO CONVERT TO ENGLISH UNITS, DIVIDE BY 0.3048.**

TABLE P-2: SUMMARY OF PEAK-NOISE-HOUR NOISE LEVELS: EXISTING AND FUTURE N-6

Location #	Receptor Number	Noise Receptor	Modeled Existing Noise Level L_{eq} (dBA)	Future - N-6 Alignment Noise Level L_{eq} (dBA)	Soundwall Number and Begin/End Stations	Soundwall Placement	Soundwall Height (meters)**	Noise Level (dBA) with Different Wall Heights						Wall Ht. Required to Break L-O-S (m)**
								1.83m**	2.44m**	3.05m**	3.66m**	4.27m**	4.88m**	
1	1	1A	72	63	N/A	N/A	None							
	2	1C	70	63	N/A	N/A	None							
	3	1-LT	71	62	N/A	N/A	None							
	4	1-M1	74	64	N/A	N/A	None							
	5	1-M2	70	63	N/A	N/A	None							
	6	1-M3	69	63	N/A	N/A	None							
	7	1-M4	70	63	N/A	N/A	None							
	8	1-M5	75	65	N/A	N/A	None							
2	9	2A	74	73	SW 1A,1B (2)	E/B	4.27	72	71	69	68	67	65	4.2
	10	2-M1	71	70	SW 1A,1B (2)	E/B	4.27	69	68	66	65	64	63	4.0
3	11	3A	75	71	SW 2A,2B (1)	E/B	3.66	68	67	65	64	63	62	0.0
4	12	4A	72	71	SW 3A, 3B (2)	E/B	3.66	68	67	66	64	63	61	0.0
5	13	5A	66	65	N/A	N/A	None							
	14	5C	64	63	N/A	N/A	None							
	15	5D	64	60	N/A	N/A	None							
	16	5-M1	67	65	N/A	N/A	None							
6	17	6A	72	62	N/A	N/A	None							
	18	6C	71	61	N/A	N/A	None							
	19	6-M1	72	62	N/A	N/A	None							
	20	6-M2	72	62	N/A	N/A	None							
7	21	7A	69	60	N/A	N/A	None							
	22	7-M1	71	61	N/A	N/A	None							
9	23	9A	76	67*	N/A	N/A	None							
	24	9-M1	76	67*	N/A	N/A	None							

E/B = EDGE OF BRIDGE DECK
LOS = LINE OF SIGHT
N/A = NOT APPLICABLE: NOISE LEVELS EITHER BELOW NOISE ABATEMENT CRITERIA OR MODELING DATA INDICATES THAT A SOUNDWALL WOULD BE INEFFECTIVE.
SOUNDWALL STATIONING:
(1) = 52+00 TO 53+40
(2) = 49+55 TO 52+00
*** - THIS ALTERNATIVE WOULD PLACE THE BRIDGE ABOVE OR ON TOP OF THIS LOCATION; SOUNDWALL INEFFECTIVE.**
**** - TO CONVERT TO ENGLISH UNITS, DIVIDE BY 0.3048.**

TABLE P-2: SUMMARY OF PEAK-NOISE-HOUR NOISE LEVELS: EXISTING AND FUTURE N-6 (Continued)

Location #	Receptor Number	Noise Receptor	Modeled Existing Noise Level L_{eq} (dBA)	Future - N-6 Alignment Noise Level L_{eq} (dBA)	Soundwall Number and Begin/End Stations	Soundwall Placement	Soundwall Height (meters)**	Noise Level (dBA) with Different Wall Heights						Wall Ht. Required to Break L-O-S (m)**
								1.83m**	2.44m**	3.05m**	3.66m**	4.27m**	4.88m**	
10	25	10A	77	65	N/A	N/A	None							
	26	10-M1	77	N/A*	N/A	N/A	None							
11	27	11A	75	64	N/A	N/A	None							
	28	11C	77	68*	N/A	N/A	None							
	29	11-M1	77	68*	N/A	N/A	None							
	30	11-M2	77	69*	N/A	N/A	None							
	31	11-M3	77	69*	N/A	N/A	None							
12	1	12A	72	85*	N/A	N/A	None							
	2	12-M1	71	84*	N/A	N/A	None							
	3	12-M2	74	86*	N/A	N/A	None							
	4	12-LT	73	83*	N/A	N/A	None							
13	5	13A	73	67	N/A	N/A	None							
	6	13C	74	70	N/A	N/A	None							
	7	13-M1	73	67	N/A	N/A	None							
	8	13-M2	71	68	N/A	N/A	None							
	9	13-M3	71	68	N/A	N/A	None							
17	10	17A	66	69	N/A	N/A	None							
	11	17-M1	70	72	N/A	N/A	None							
18	12	18A	69	70	N/A	N/A	None							
	13	18-M1	66	68	N/A	N/A	None							
	14	18-M2	65	67	N/A	N/A	None							
20	32	20A	72	62	N/A	N/A	None							
	33	20-M1	72	62	N/A	N/A	None							
21	34	21A	74	60	N/A	N/A	None							
	35	21-M1	73	60	N/A	N/A	None							
	36	21-M2	73	60	N/A	N/A	None							
	37	21-M3	73	59	N/A	N/A	None							
	38	STUDIO	67	59	N/A	N/A	None							

E/B = EDGE OF BRIDGE DECK

LOS = LINE OF SIGHT

N/A = NOT APPLICABLE: NOISE LEVELS EITHER BELOW NOISE ABATEMENT CRITERIA OR MODELING DATA INDICATES THAT A SOUNDWALL WOULD BE INEFFECTIVE.

SOUNDWALL STATIONING:

(1) = 52+00 TO 53+40

(2) = 49+55 TO 52+00

*** - THIS ALTERNATIVE WOULD PLACE THE BRIDGE ABOVE OR ON TOP OF THIS LOCATION; SOUNDWALL INEFFECTIVE.**

**** - TO CONVERT TO ENGLISH UNITS, DIVIDE BY 0.3048.**

Oakland Touchdown Area. One of the ten modeled receptors for Replacement Alternative N-6 (Receptor 17-M1) in the Oakland Touchdown area has peak-noise-hour levels which exceed the FHWA NAC for Activity Category C (commercial uses) of 72 dBA L_{eq}. However, there are no exterior areas of frequent human use for which lower noise levels would be of benefit.

Replacement Alternative S-4

Yerba Buena Island. The noise levels at Locations 2, 3, 4, 9, and 11 would equal or exceed the 67 dBA L_{eq} criteria.

Soundwalls which would reduce noise levels 5 dB or more and break truck-stack line-of-sight at YBI are the same for Replacement Alternative S-4 as for Replacement Alternative N-2. (See Table P-3 in this section and Figure 4-18 in Appendix A for recommended soundwall locations for Replacement Alternative S-4.)

Oakland Touchdown Area. Four of the ten modeled receptors in the Oakland Touchdown area (Receptors 12-M2, 13-M3, 17-M1, and 18-A) have peak-noise-hour levels which approach or exceed the FHWA NAC for Activity Category C of 72 dBA L_{eq} under this alternative. However, there are no exterior areas of frequent human use for which lower noise levels would be of benefit.

Options for Noise Abatement Materials and Treatment. Options for abating noise by using different barrier materials, tunnel portal treatments, and roadway pavement materials were reviewed for the East Span Project. These options and their and their potential potential effectiveness are summarized below. Selection of barrier materials would be subject to evaluation of a number of factors in addition to their effectiveness in providing noise abatement. Additional factors include maintenance requirements, expected period of serviceability, and life-cycle costs.

Standard Soundwall. Examples of standard materials are masonry block and precast concrete. Generally the heaviest barrier per unit dimension, it requires a slightly more massive supporting structure; the reverberant soundfield may increase noise level between closely spaced parallel soundwalls; it has potential for reflecting traffic noise into adjacent areas that are located nearby, above, and opposite from the soundwall; it is not visually transparent.

Acoustically Absorptive Soundwall. Multiple reflections between parallel barriers can potentially reduce the acoustical performance of each individual barrier. When designing reflective parallel noise barriers, it is recommended that a minimum 10:1 ratio is maintained between two barriers in order to avoid the possibility of perceivable barrier performance degradations. If that is not possible, acoustically absorptive barriers may have to be considered. The recommended aspect ratio (10:1 or greater) could be achieved for this project and, therefore, no further noise abatement in the form of acoustically absorptive barriers would be required.

TABLE P-3: SUMMARY OF PEAK-NOISE-HOUR NOISE LEVELS: EXISTING AND FUTURE S-4

Location #	Noise Receptor	Modeled Existing Noise Level L_{eq} (dBA)	Future - S-4 Alignment Noise Level L_{eq} (dBA)	Soundwall Number and Begin/End Stations	Soundwall Placement	Soundwall Height (meters)**	Noise Level (dBA) with Different Wall Heights						Wall Ht. Required to Break L-O-S (m)**
							1.83m**	2.44m**	3.05m**	3.66m**	4.27m**	4.88m**	
1	1A	72	63	N/A	N/A	None							
	1C	70	63	N/A	N/A	None							
	1-LT	71	62	N/A	N/A	None							
	1-M1	74	64	N/A	N/A	None							
	1-M2	70	62	N/A	N/A	None							
	1-M3	69	62	N/A	N/A	None							
	1-M4	70	62	N/A	N/A	None							
	1-M5	75	64	N/A	N/A	None							
2	2A	74	73	SW 1A,1B (2)	E/B	4.27	71	70	69	68	67	66	4.2
	2-M1	71	70	SW 1A,1B (2)	E/B	4.27	69	67	66	65	64	63	4.0
3	3A	75	71	SW 2A,2B (1)	E/B	3.66	68	67	65	64	63	61	3.2
4	4A	72	70	SW 3A, 3B (2)	E/B	3.66	68	67	66	65	63	62	3.5
5	5A	66	65	N/A	N/A	None							
	5C	64	64	N/A	N/A	None							
	5D	64	61	N/A	N/A	None							
	5-M1	67	66	N/A	N/A	None							
6	6A	72	62	N/A	N/A	None							
	6C	71	62	N/A	N/A	None							
	6-M1	72	62	N/A	N/A	None							
	6-M2	72	62	N/A	N/A	None							
7	7A	69	61	N/A	N/A	None							
	7-M1	71	62	N/A	N/A	None							
9	9A	76	67	N/A	N/A	None							
	9-M1	76	67	N/A	N/A	None							
10	10A	77	65	N/A	N/A	None							
	10-M1	77	66	N/A	N/A	None							

E/B = EDGE OF BRIDGE DECK
LOS = LINE OF SIGHT
N/A = NOT APPLICABLE: NOISE LEVELS EITHER BELOW NOISE ABATEMENT CRITERIA OR MODELING DATA INDICATES THAT A SOUNDWALL WOULD BE INEFFECTIVE
SOUNDWALL STATIONING:
(1) = 52+00 TO 53+40
(2) = 49+55 TO 52+00
*** - THIS ALTERNATIVE WOULD PLACE THE BRIDGE ABOVE OR ON TOP OF THIS LOCATION; SOUNDWALL INEFFECTIVE.**
**** - TO CONVERT TO ENGLISH UNITS, DIVIDE BY 0.3048.**

TABLE P-3: SUMMARY OF PEAK-NOISE-HOUR NOISE LEVELS: EXISTING AND FUTURE S-4 (Continued)

Location #	Noise Receptor	Modeled Existing Noise Level L_{eq} (dBA)	Future - S-4 Alignment Noise Level L_{eq} (dBA)	Soundwall Number and Begin/End Stations	Soundwall Placement	Soundwall Height (meters)**	Noise Level (dBA) with Different Wall Heights						Wall Ht. Required to Break L-O-S (m)**
							1.83m**	2.44m**	3.05m**	3.66m**	4.27m**	4.88m	
11	11A	75	64	N/A	N/A	None							
	11C	77	N/A*	N/A	N/A	None							
	11-M1	77	N/A*	N/A	N/A	None							
	11-M2	77	69	N/A	N/A	None							
	11-M3	77	N/A*	N/A	N/A	None							
12	12A	72	68	N/A	N/A	None							
	12-M1	71	67	N/A	N/A	None							
	12-M2	74	71	N/A	N/A	None							
	12-LT	73	70	N/A	N/A	None							
13	13A	73	68	N/A	N/A	None							
	13C	74	N/A*	N/A	N/A	None							
	13-M1	73	N/A*	N/A	N/A	None							
	13-M2	71	N/A*	N/A	N/A	None							
	13-M3	71	72	N/A	N/A	None							
17	17A	66	69	N/A	N/A	None							
	17-M1	70	73	N/A	N/A	None							
18	18A	69	72	N/A	N/A	None							
	18-M1	66	69	N/A	N/A	None							
	18-M2	65	67	N/A	N/A	None							
20	20A	72	63	N/A	N/A	None							
	20-M1	72	63	N/A	N/A	None							
21	21A	74	62	N/A	N/A	None							
	21-M1	73	62	N/A	N/A	None							
	21-M2	73	62	N/A	N/A	None							
	21-M3	73	61	N/A	N/A	None							
	STUDIO	67	58	N/A	N/A	None							

E/B = EDGE OF BRIDGE DECK
LOS = LINE OF SIGHT
N/A = NOT APPLICABLE: NOISE LEVELS EITHER BELOW NOISE ABATEMENT CRITERIA OR MODELING DATA INDICATES THAT A SOUNDWALL WOULD BE INEFFECTIVE
SOUNDWALL STATIONING:
(1) = 52+00 TO 53+40
(2) = 49+55 TO 52+00
*** - THIS ALTERNATIVE WOULD PLACE THE BRIDGE ABOVE OR ON TOP OF THIS LOCATION; SOUNDWALL INEFFECTIVE.**
**** - TO CONVERT TO ENGLISH UNITS, DIVIDE BY 0.3048.**

Viewshed Soundwall. These soundwalls are visually transparent noise barriers; alternative material is glass; acoustical performance equivalent to standard reflective soundwalls; substantially lighter weight per unit area than standard masonry soundwall material; reverberant soundfield may increase noise level between parallel soundwalls; has potential for reflecting traffic noise into adjacent areas that are located nearby, above, and opposite from the soundwall; panel sections designed to be readily disassembled and replaced without affecting adjacent sections or losing acoustical performance; newer generation of materials are non-yellowing/glazing to maintain visual transparency; the vertical (and optionally) horizontal framing and supporting structures are fabricated of solid material that is not transparent.

Combination Viewshed/Acoustically Absorptive Soundwall. The metal sandwich type of transportation noise panel system has provision for intermixing transparent view panels with the visually opaque, acoustically absorptive panels. The see-through panels may be inserted below, between, and/or above the solid panels. Depending on the specific combination and placement of panel types, the acoustic characteristics of the combination soundwall will be more or less similar to reflective or absorptive soundwalls; substantially lighter weight per unit area than standard masonry soundwall material; panel sections designed to be readily disassembled and replaced without affecting adjacent sections, or changing acoustical performance and visual characteristics.

Reduced Noise Pavement Surfaces. Non-standard pavement surfaces have been alleged to reduce traffic noise. The most common pavement types referred to for this effect are "open graded" asphalt concrete and "rubberized" asphalt. Although the non-acoustic properties of these pavement types are documented and standard specifications for their use are available, their benefits in noise reduction are only recently being published, with scientific research by Caltrans in process. Recently released data[1] concluded that dense asphalt is approximately 3 dBA quieter than PCC with new open graded asphalt providing an additional 1.5 dBA lower noise level. However, the data suggests that open graded noise levels will be similar to dense graded material after some years of wear. Rubberized binder asphalt may reduce pavement noise levels by approximately three decibels; however sufficient study data is not currently available to support firm conclusions. Another study[2] found that noise levels from open graded asphalt were approximately five decibels lower than for grooved PCC. These pavement types should be considered for use on the SFOBB project, but their noise abatement abilities must be considered along with other factors (such as life-cycle cost) important to pavement type selection.

Tunnel Portal Acoustic Treatment. Noise levels in the immediate vicinity of traffic tunnel portals are noted to be higher than at some distance from the portals. Placement of acoustically absorptive materials inside the portals has resulted in reduction of higher

[1] Wayson, Roger, NCHRP Synthesis, Transportation Research Board Proceedings, St. Petersburg, Florida, July 1998.

[2] Bajkec, Christopher, Vehicle Noise Emissions and Pure-Tone Characteristics of Different Pavements: A Case Study.

noise levels experienced outside the portal.[3] According to the literature, however, the benefits of tunnel portal treatment diminish substantially at distances of approximately 100 meters (328 feet). Because the nearest noise-sensitive receptors are approximately 100 meters away from the tunnel portal, the benefits of acoustic treatment of the tunnel portal for this project would likely be marginal.

[3] Noise Control Engineering Journal, Institute of Noise Control Engineering of the USA, *Sound Propagation at Tunnel Openings*, September-October 1992.